August 18, 1947

STEEL

The Magazine of Metalworking and Metalproducing

ESTABLISHED 1882

CHNOLOGY DEPARTMENT

EDITORIAL INDEX, PAGE 51

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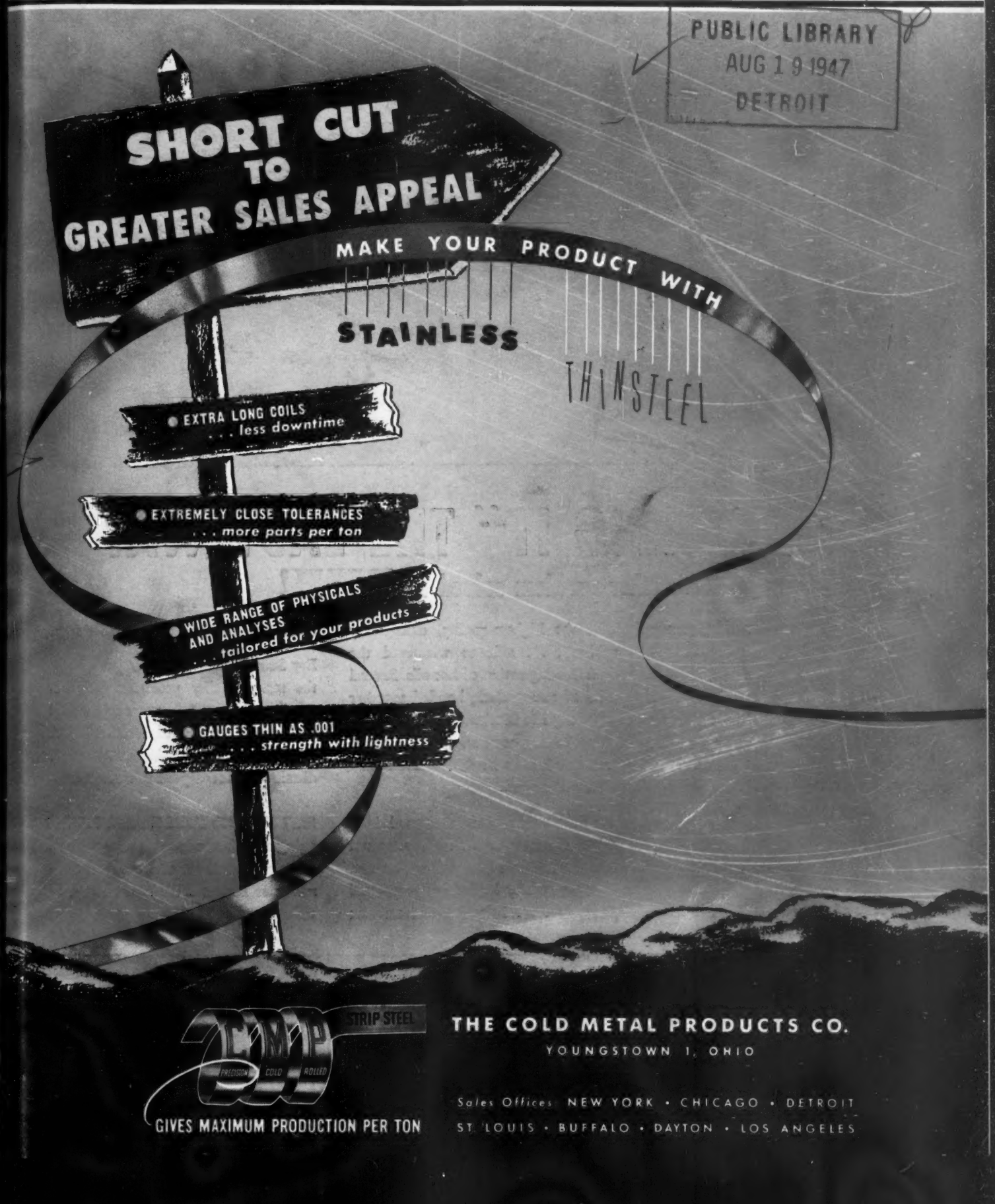
SHORT CUT
TO
GREATER SALES APPEAL
MAKE YOUR PRODUCT WITH
STAINLESS
THINSTEEL
● EXTRA LONG COILS
. . . less downtime
● EXTREMELY CLOSE TOLERANCES
. . . more parts per ton
● WIDE RANGE OF PHYSICALS
AND ANALYSES
. . . tailored for your products
● GAUGES THIN AS .001
. . . strength with lightness
STRIP STEEL
PRECISION COLD ROLLED
GIVES MAXIMUM PRODUCTION PER TON
THE COLD METAL PRODUCTS CO.
YOUNGSTOWN 1, OHIO
Sales Offices NEW YORK • CHICAGO • DETROIT
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"ROUGHING IT" THE EASY WAY

Another problem solved by BWH!

Applying a new facing to a big western dam posed a problem for the contractor. The old face had to be "roughed" with compressed air into an irregular pattern to hold the new concrete. That meant finding an air hose that could "take" high pressures, heat and oil from the compressors, shocks from sharp falling rocks and contact with rocky surfaces. To handle this job, BWH recommended tough Bay State Air Drill Hose.

The tube of this rugged hose is made with the highest-quality, extra-heavy rubber . . . able to withstand the deteriorating action of hot oils. Several plies of strong duck, bonded together with long-life friction, form the carcass. Since the contractor selected 2½" hose, the duck had to be 40% heavier than for smaller sizes.

Tube and carcass were encased in a stout rubber cover . . . the strongest ever devised to resist surface damage. This powerfully built hose performed perfectly . . . helped the contractor finish the job without costly delays.

Bay State Air Drill Hose is just one of the many quality products manufactured by BWH. Whatever industrial rubber goods you need, look to BWH for dependable ruggedness . . . BWH distributors for dependable service.

HAVE YOU A JOB WHERE STAMINA COUNTS?
Bring us your toughest problems . . . we're specialists in solving them. Consult your nearest BWH distributor, or write direct.

BOSTON WOVEN HOSE & RUBBER COMPANY

Distributors in All Principal Cities

WORKS: CAMBRIDGE, MASS., U. S. A. • P. O. BOX 1071, BOSTON 3, MASS.

DIPPER STICK *with 3 lives*

The Mayari R, two-part dipper stick on this 13-cu yd shovel has lasted three times as long as previous sticks made from ordinary carbon steel.

Midwest Radiant Corporation, operators of the shovel, were getting an average of 6 months service from carbon-steel dipper sticks. In addition, they were frequently forced to halt operations and make repair welds.

In January, 1946, Midwest switched over to Mayari R. Their first dipper stick made from this low-alloy, high-strength steel is still in operation after more than 18-months service. It weighs the same as the carbon-steel sticks—yet it has developed no fractures and has required no repairs since it was installed.

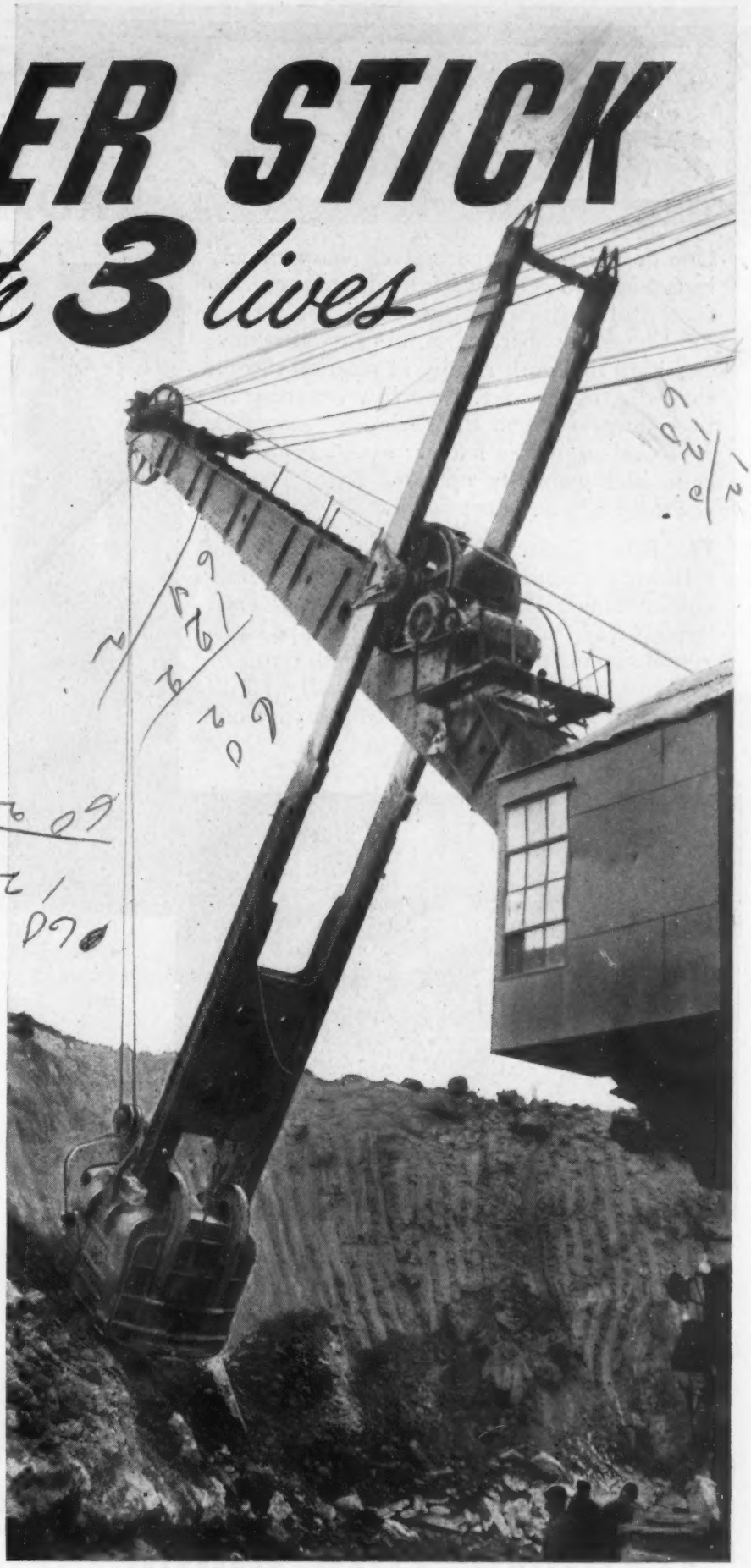
This is another case where Mayari R shows a distinct advantage and considerable savings over ordinary materials. Mayari R is a versatile steel, well adapted to use in many types of equipment where high strength, weight-reduction and resistance to atmospheric corrosion are important.

For further information regarding Mayari R, its properties, and its applications in various industrial fields, write for Catalog 209.

BETHLEHEM STEEL COMPANY
Bethlehem, Pa.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation

★ BETHLEHEM STEEL ★



13-cu yd shovel with Mayari R dipper stick. This stick has been in operation for more than 18 months and has required no repairs.

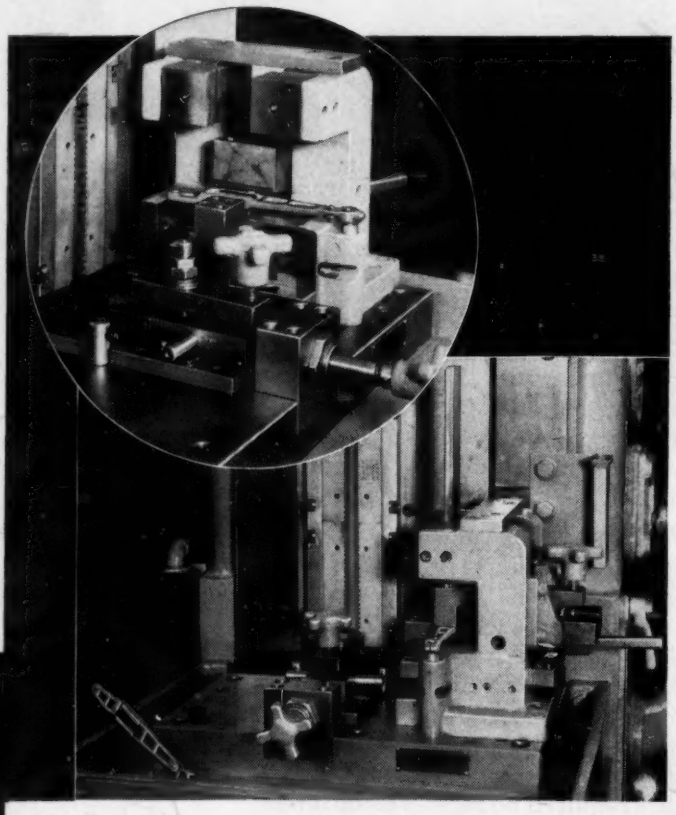
Mayari R *makes it lighter... stronger... longer lasting*

American

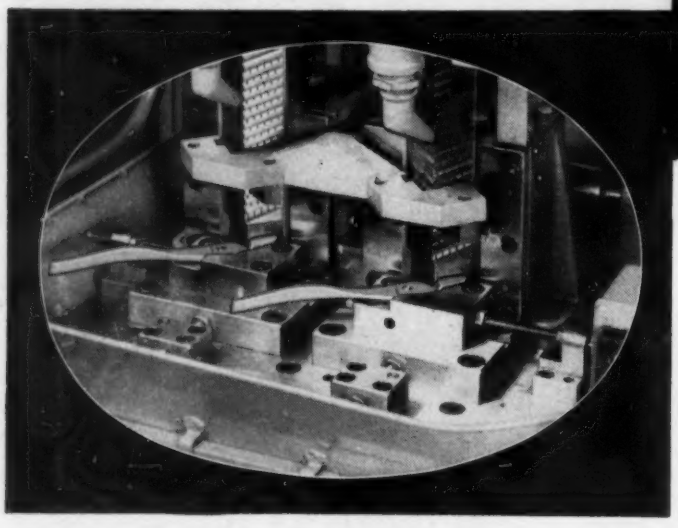
THE ONE SOURCE FOR *ALL* YOUR BROACHING NEEDS

One of the most important elements of any broaching job is the work holding fixture. To successfully obtain top production the fixture must be easily operated, solid in construction, and hold the work rigidly in position during the broaching stroke. *American* fixture engineers are skilled in the design of automatic and semi-automatic fixtures for high production, and manually operated fixtures when economy is a foremost factor.

For better broaching *American* builds the following complete line of broaching machines: Single Ram, Duplex Ram, Universal Type 3-way, Vertical Internal Pull-up, Horizontal, and Rotary. All sizes and types of broaches are also available, as well as Pull and Push Heads from *American*, as your one source of broaching needs.



(Above)—A simplified manually operated two station fixture to produce two sewing machine parts to close limits. A cast iron Slide Block is straddle broached at the left hand station; a slot in a malleable iron Main Connection part is surface broached at the right hand station. Parts are clamped manually, and floating jacks, also manually-operated, are provided to prevent springing of the Main Connection part. Exceptionally fine finish is obtained on both parts which interlock in the final sewing machine mechanism.



(Above)—This *American* designed fixture for broaching the jaw teeth of plier halves consists of two work stations. Separate work locators are supplied for each type of plier half. Parts are automatically clamped and unclamped by means of an air cylinder. Location is taken from the previously drilled hole in the forged steel part. Production of plier halves is increased considerably over the previous machining method.

VISIT AMERICAN BROACH BOOTH 22

MACHINE TOOL SHOW

CHICAGO SEPT. 17-26

MEMBER BROACHING TOOL INSTITUTE

American

BROACH AND MACHINE CO.

ANN ARBOR, MICHIGAN

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BROACHING MACHINES
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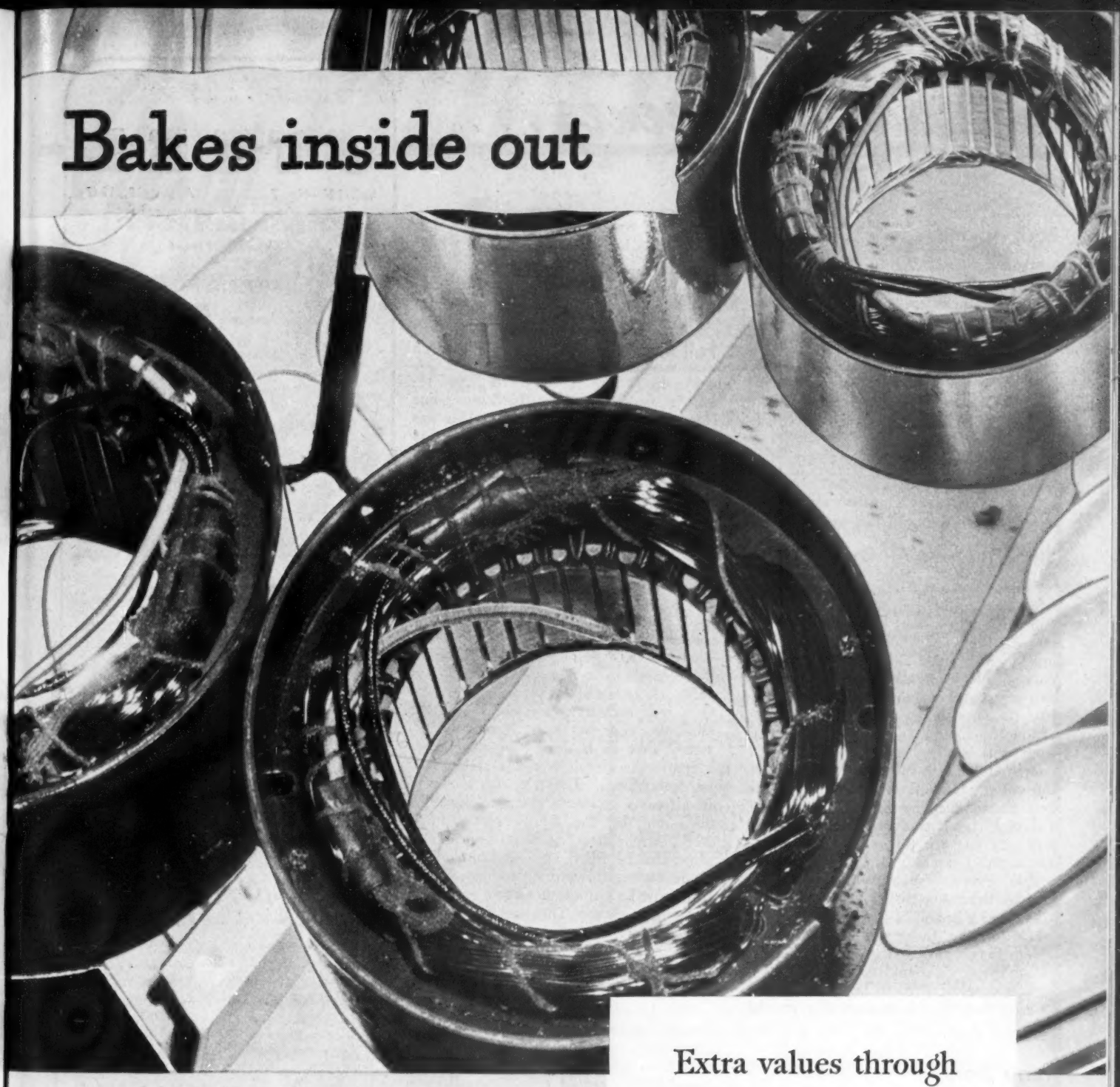
BROACHING TOOLS
SPECIAL MACHINERY

DIVISION OF SUNDSTRAND MACHINE TOOL CO. ROCKFORD, ILLINOIS, U.S.A.



Bakes inside out

Extra values through

JACK & HEINTZ

Mass Precision

The penetrating rays of infra-red lamps heat the windings of Jack & Heintz fractional horsepower motors *from the inside out.*

Banks of these lamps *preheat* the windings; then, after a hot varnish dipping, they bake them dry.

Insulating varnish gets into and is baked into every pore, making the windings of Jack & Heintz motors exceptionally *tough* and *moisture-resistant* . . . locking out trouble for keeps.

JACK & HEINTZ PRECISION INDUSTRIES, INC., *Cleveland 1, Ohio*

Behind the Scenes...

Back Again!

H'mm. Ahem. Well, well. A Typewriter, no less. Before, somewhere, we've seen these gadgets. Ah, me. It was wonderful while it lasted, anyhow. Now to clean off seventeen feet of accumulated mail and three old fenders from a 1938 Ford and get back to work. At least two other people around this printshop now know the agonies of beating out a colyume like this, we're thinking that our pinch-hitters did a very good job, too. We are hereby reminding ourselves to go away more often and let the customers get a rest.

Stuff Happens All Over

Seems like a lot of things happened while we were relaxing in a nearby hammock with a short beer. The weather, for one thing, has been trying to make up for lost time and bring in a little concentrated summer. Prices of steel and scrap and automobiles are going up like the thermometer, and even on vacation we couldn't get completely away from this stuff, because we heard a couple of the network newscasters pointing out the latest dope on the steel markets as compiled by STEEL, which they (as well as you readers) recognize as an authority on such things. The silly season is on in earnest, with things happening in reverse. Women life guards are saving drowning males, and here in Cleveland a bunch of little boys succeeded in driving the cops out of the lot where they were playing baseball. Seems like a good time to have this type set upside down, but there are proofreaders around here that frown on that sort of thing.

Ferry Story

Did you hear about the New York executive who lived just a short ferry ride from Manhattan? Seems that he left the office a little early one night and arrived at the ferry slip 45 minutes before the next scow was due to take off (some of them must have sunk enroute or something) so he beat his way back to Joe's Bar, just across the street and around the corner. One drink led to another and soon he realized he had just 1½ minutes to catch that boat. He weaved his way out of the bar, slithered around the corner and sloshed across the street. Approaching the gates, he saw the ferry just about ten feet out in the water. Summoning all his strength, he made a mighty leap and tumbled head over heels on the deck of the ferry. "Ah," said he, "I've leaped a mighty river just to be home with my wife and children" "Yeah,' said one of the ferry riders, "that was a real jump all right, but why didn't you wait another minute? We were just pulling in!"

Fall Over When Dead, Please

We liked a small bit of employee relations which purports to have come from Sears & Roebuck, via the "Postage Stamp." It's a memo to employees in Sears' Division 42, and reads as follows: "RE—Subject of death of Division 42 Employees. It has come to our attention that many employes are dying and refusing to fall when they are dead. THIS MUST STOP! After Jan. 1, any employe found standing after death will be dropped from the payroll. An investigation by the store manager will be made very quietly so as not to disturb the employees if they are only asleep. There is a close resemblance between death and their normal working attitude. A test will be made. The manager will extend a pay check. If the employee does not react it may be assumed that he is dead. In some cases a spasmodic clutch or reflex action may be encountered. Don't let this fool you! In all cases, a sworn statement must be filled out by the dead person. Form 22W, Application for Permanent Leave, must also be filled out. Be sure to include correct forwarding address. Signature must be witnessed by two employes, preferably alive. Then move body to make room for next incumbent."

What, More Puzzles?

Just to prove that little things make lasting impressions, or some other such conclusion, we had a rush call the other day from one of the large steel companies asking would we please tell them when the ladder-and-alley puzzle appeared here and when we ran the answer. We're hoping some of the more important facts published by the editors stick in their memory just as well. But what that really does is bring up the subject of puzzles, and so we thought we'd throw one in here for light summer thinking. If this one takes you more than 45 seconds, you're slipping. A frog is at the bottom of a 30-foot well. Each hour he climbs up three feet and slides back two feet. How many hours does it take him to climb out of the well? And don't try to tell us the obvious answer, on account of it isn't right!

Shrdlu

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STEEL

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Editorial Staff on Contents Page

New MULTIPRESS Dial Feed Table

Will boost your production on small part processing!

★ If your manufacturing calls for rapid feeding of small parts, you'll get a surprising boost in your production figures using the new Denison Dial Feed Table Accessory. Crimping, pressing, marking, dimpling, stamping, broaching and shearing are but a few of the operations requiring a feed of this type.

You eliminate the use of extensive tooling except at the working station. Parts are loaded on the table or in holding fixtures, as desired. Finished parts are ejected at the working station or at a point 120° from this station, where punch-through provision has been made. The operator loads away from the press ram—away from dangerous moving parts for greater safety. Indexes may be set at 8, 12 or 24 per cycle, depending on the size of the part or the operating speed desired.

Low initial cost plus economy of operation, tooling and maintenance make this accessory ideal for Multipress users who have many short run operations, or other production where it is not practical to use extensive tooling set-ups. The Dial Feed Table is adaptable for use with either the 4, 6, or 8-ton Multipress. It can be furnished with or without the standard die set as illustrated. Write today for descriptive bulletin and complete information on this NEW, production-boosting Denison Dial Feed Table accessory.

THE **DENISON** ENGINEERING CO.

1163 Dublin Road, Columbus 16, Ohio

DENISON EQUIPMENT for APPLIED HydrOILics

MILESTONES IN AMERICAN INDUSTRIAL DEVELOPMENT

When the first telegram was sent... "STANDARD" products were helping industry—as they do today

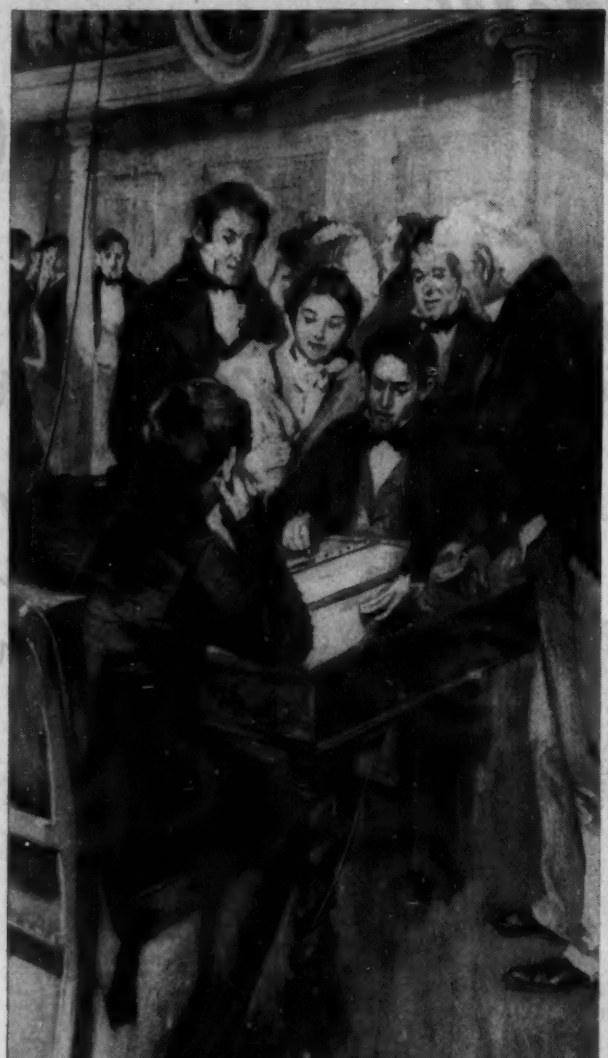


ILLUSTRATION FROM THE BETTMAN ARCHIVES

No more momentous words ever emerged from the Supreme Court Chambers than those sent out as a series of dots and dashes in 1844 by inventor Samuel F. B. Morse..."What hath God Wrought". It was the first message transmitted over the newly installed telegraph line between Washington and Baltimore. Acceptance and extension of the new invention was almost immediate, and by 1850 lines covered almost all the country except the far west.

During this same period, "Standard"—half a century old—was producing some of the best wrought iron in the country, reputed by authorities to be the equal of the best Swedish or Russian iron. These same standards have been continuously maintained throughout the years. Every forging and casting produced reflects the know-how gained in a century and a half of continuous operation, and the continuous, careful supervision and control that safeguards quality.

To simplify your forging and casting needs, "Standardize on Standard." The Baldwin Locomotive Works, Standard Steel Works Division, Burnham, Pa., U. S. A. Offices: Philadelphia, New York, Chicago, St. Louis, Washington, Boston, San Francisco, Cleveland, Detroit, Pittsburgh, Houston, Birmingham, Seattle.

STANDARD STEEL WORKS DIVISION

BLW THE BALDWIN GROUP

BALDWIN

FORGINGS AND CASTINGS

NORTHWEST

Simplicity of Design

keeps yard costs down!

Here is the deck view of a Northwest. Note the simplicity of design. There are only two main shafts and all assemblies are readily accessible.

DESIGN complications mean higher upkeep costs. Northwest simplicity assures easy maintenance. Look at the deck of a Northwest. Simple, isn't it! Only two main shafts, few gears, a direct line of power without complications. Everything *get-at-able,* easy to adjust, easy to maintain.

Simplicity of design means better yard service—uninterrupted yard service. Your Northwest brings you truck dependability. It eliminates the time lost with steam equipment. It is not confined to definite areas as is locomotive equipment. It goes anywhere, handles practically anything within its rated capacity and when the engine stops operating costs stop.

Crawler Crane handling is the modern method of storeyard handling. Plan ahead to cut your storeyard costs. Ask about Northwest Crawler Cranes.

Gears too, are few in number. Compare this with the complications of other machines. Simplicity means lower cost operation and maintenance.

NORTHWEST ENGINEERING COMPANY
1508 Field Building, 135 South LaSalle Street, Chicago 3, Illinois

NORTHWEST

The Crane that goes Anywhere!

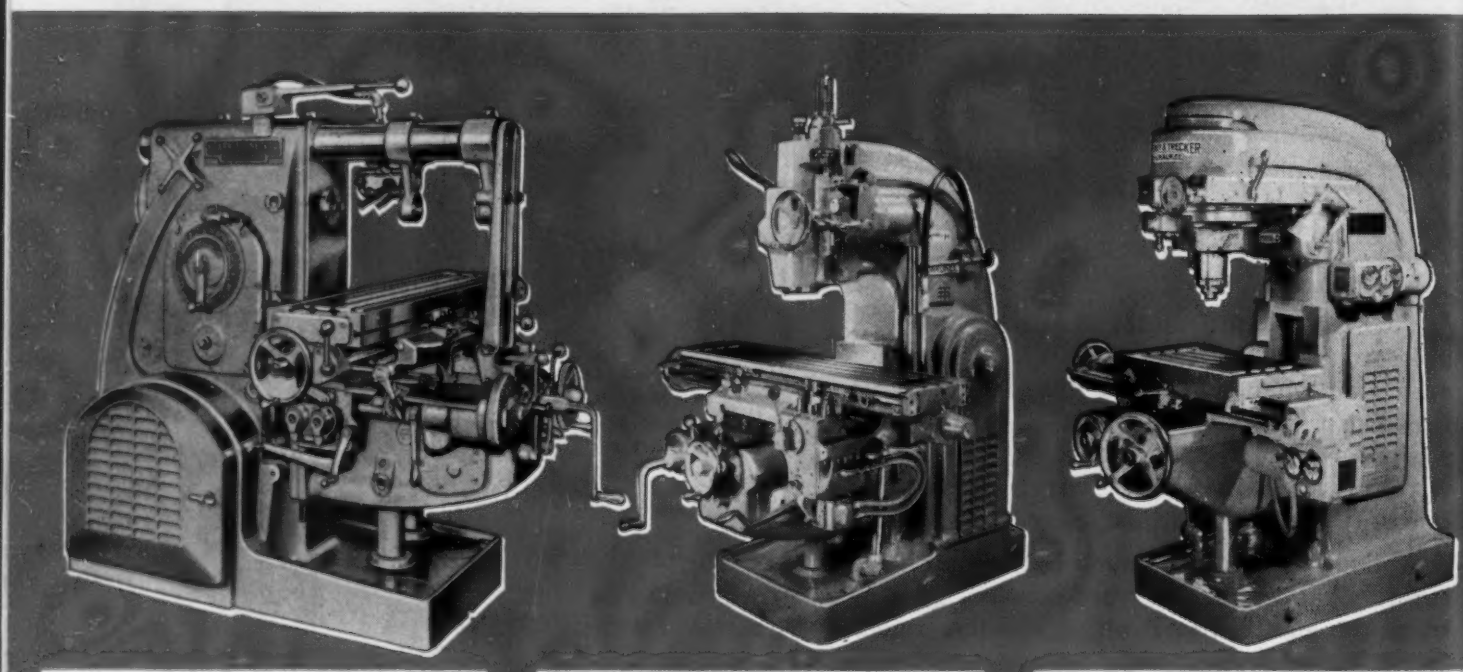
4 to 44 tons

MACHINE TOOL

Kearney & Trecker presents tomorrow's

wait one, two or three months for

1 MILLING MACHINES AT THEIR BEST— DESIGNED TO PUSH COST CURVES DOWN!



CSM Milling Machines— Super-powered— Set new high metal removal records!

Here's the machine that really *uses Carbide cutters to top efficiency.* This means a big boost in your production. You can get either Plain or Vertical Types in two working ranges with either 20, 30 or 50 horsepower.

Write for bulletin No. CSM-20.

Automatic Cycle Models —Combine hi-production use with Knee-type versatility!

Yes! You get automatic operation for long-run lots . . . new, simpler and easier control for short-runs. Your choice of 34 different Knee-Type Automatics, Plain or Vertical models in 14 different sizes and horsepower.

Write for bulletin No. AC10.

Rotary Head Milling Machine — Revolutionary! Produces any geometric shape!

The most versatile milling machine you ever saw! Works on entirely new principles. Mills any geometric form *without* models, templets or tracing devices. Can practically *guarantee 35% savings* on most tools, dies, molds.

Write for bulletin No. 1002C.

See these and other great new Kearney & Trecker machine tools at the Machine Tool Show Sept 17-26

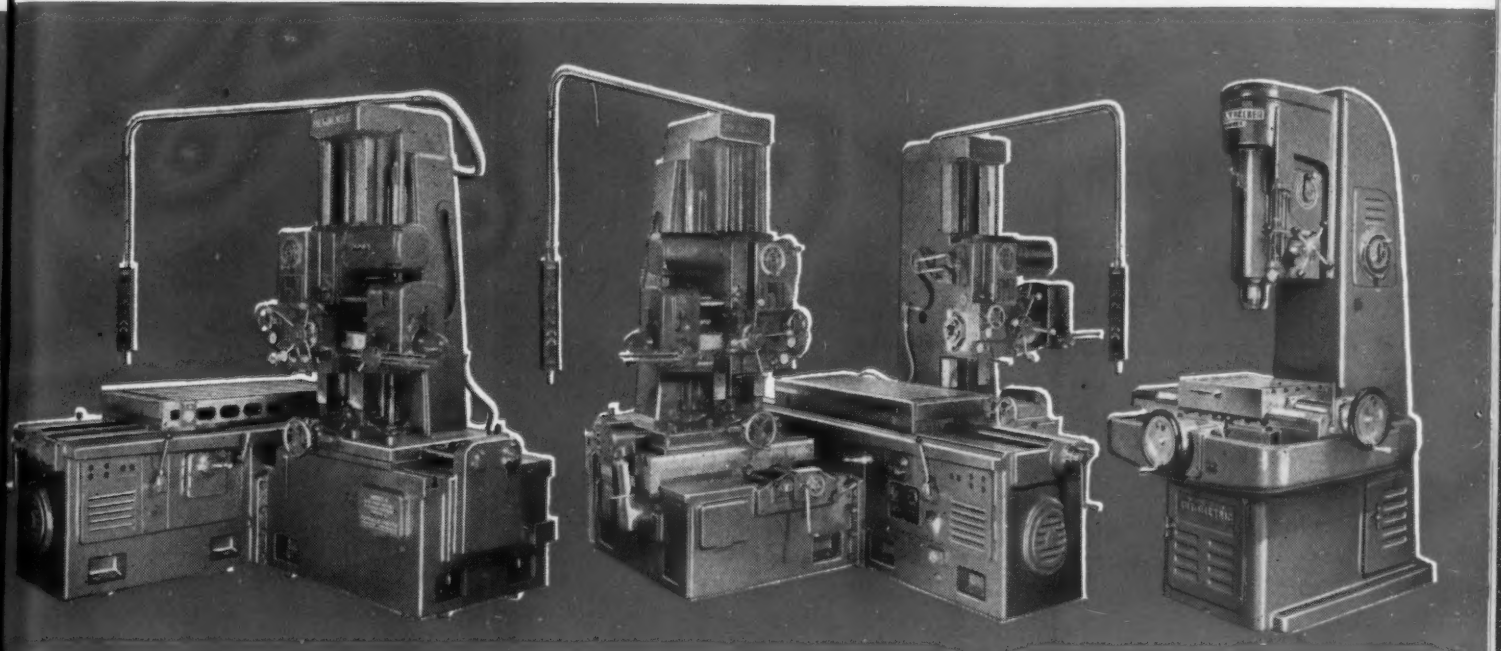
KEARNEY &

CORPORATION

PRE-VIEW . . .

machines today . . . and you don't have to them . . . They're available right now!

2 BORING MACHINES AT THEIR BEST— DESIGNED TO PUSH PRECISION CURVES UP!



Models No. 3T and No. 3TT Precision Milling and Boring Machines —Specifically built to meet exacting requirements of ultra-close tolerance milling and boring on production, tool, jig or fixture work.

You can put the most exacting of "plus-or-minus tolerance" milling or boring jobs on either of these machines and be *perfectly confident* of top results. For single-spindle applications, the Model T machine provides wide working range. The Model No. 3TT can be used for performing precision milling and boring operations simultaneously on single workpiece without resetting. Both machines are ideally suited to precision and production boring and milling. Yes — for "fussy" development or tool room jobs you'll get the kind of precision you're looking for.

Write for bulletin No. T11A.

Model C Autometric — America's top machine for Precision Boring.

You get the benefit of nearly a half century of research in precision boring and the most exacting machine standards ever set at Kearney & Trecker. The Model C Autometric will produce incredibly accurate results for you.

Write for bulletin No. CMA-10A.

TRECKER

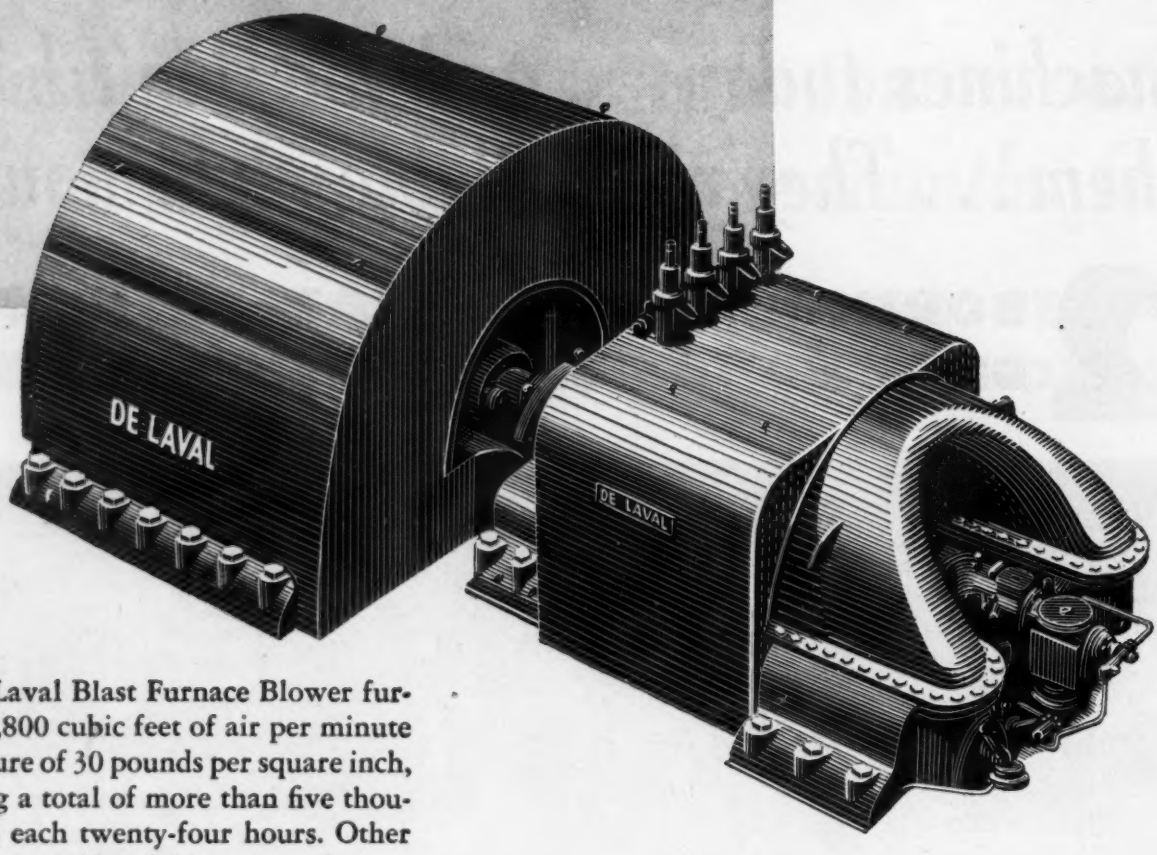
MILWAUKEE 14, WISCONSIN

KEARNEY & TRECKER MILWAUKEE MACHINE TOOLS

4710

AIR

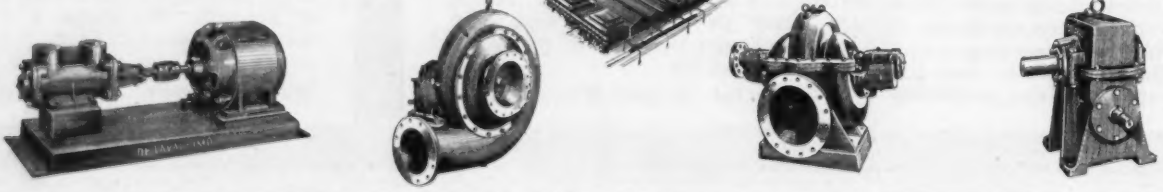
BY THE TON



This De Laval Blast Furnace Blower furnishes 97,800 cubic feet of air per minute at a pressure of 30 pounds per square inch, delivering a total of more than five thousand tons each twenty-four hours. Other De Laval centrifugal blowers and compressors are built for furnishing air and gases in large quantities at medium and moderately high pressures for chemical processing, oil refinery operations, sewage aeration, gas plants, coke ovens, aeronautical research and other industrial operations. For air by the ton consult De Laval.

DE LAVAL

De Laval *for Industry*



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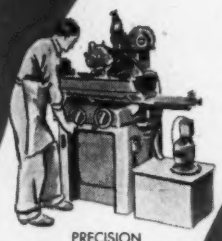
DoALL'S OWN *Separate Machine Tool* SHOW

SEPTEMBER 15 TO 26

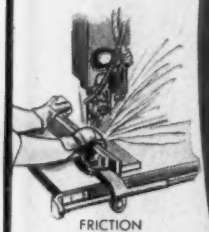
AT DES PLAINES, NEAR CHICAGO

free round-trip transportation from Chicago-Dodge Plant



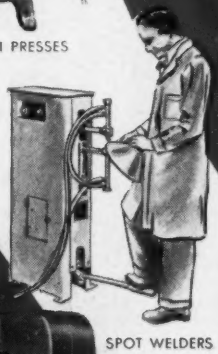
PRECISION SURFACE GRINDING

ELECTRONIC INSPECTION

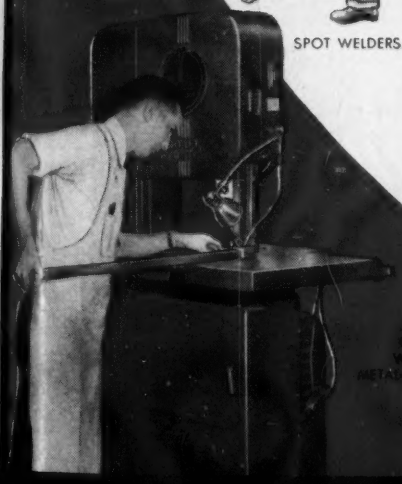


FRICTION SAWING

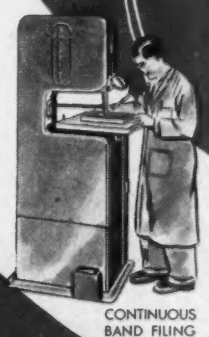
PUNCH PRESSES



SPOT WELDERS

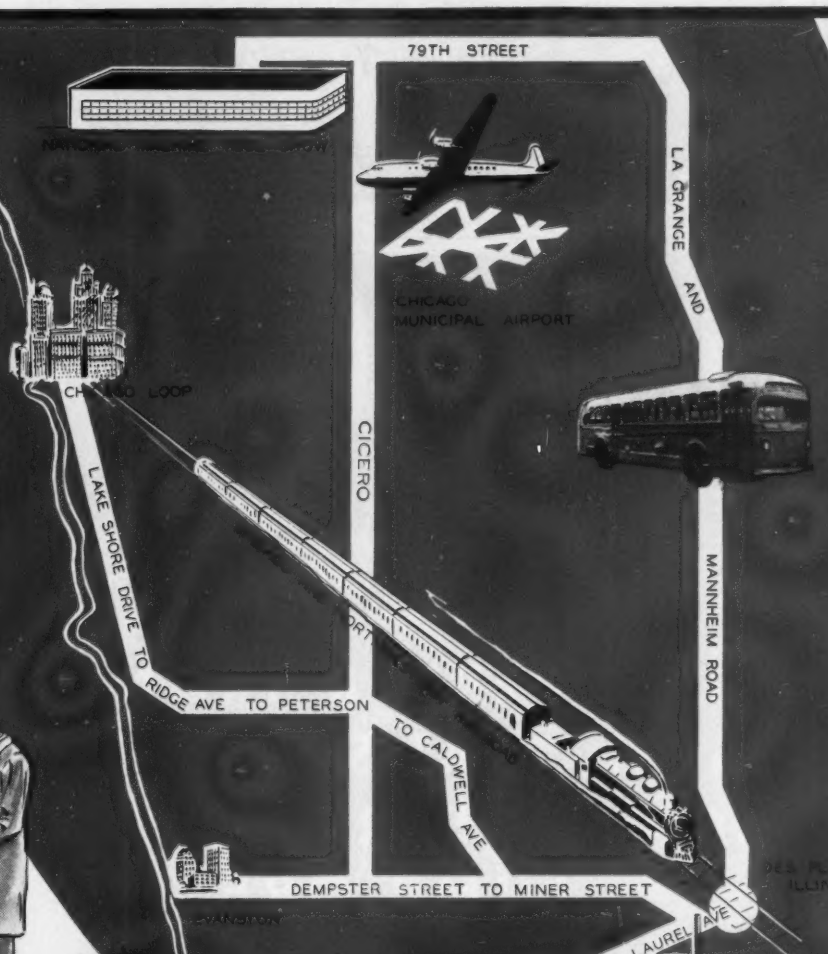


CONTOUR SAW WORLD'S FASTEST METAL-REMOVING MACHINE

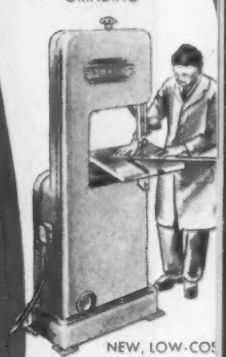


CONTINUOUS BAND FILING

COMBINATION HEAT-TREATING UNIT



CARBIDE-TOOL GRINDING



NEW, LOW-COST BAND SAWS

HIGH-PRECISION LATHES

HERE'S YOUR TICKET (More Available on Request)
FREE ROUND TRIP TO DoALL CO., DES PLAINES, ILL.
Get bus schedules at DoALL booth 37 Machine Tool Show or booth 100 at International Amphitheater Show. Upon arrival at DoALL, Des Plaines, Ill., you will be reimbursed for bus or train fare from Chicago.

NAME_____ COMPANY_____

ADDRESS_____ CITY_____ STATE_____

★MARJI GESICK

★ Marji Gesick, Chippewa Indian Chief, in 1845, pointed the way to the discovery of iron ore in the Northwest. Cliffs operations in that region have been continuous since that discovery.

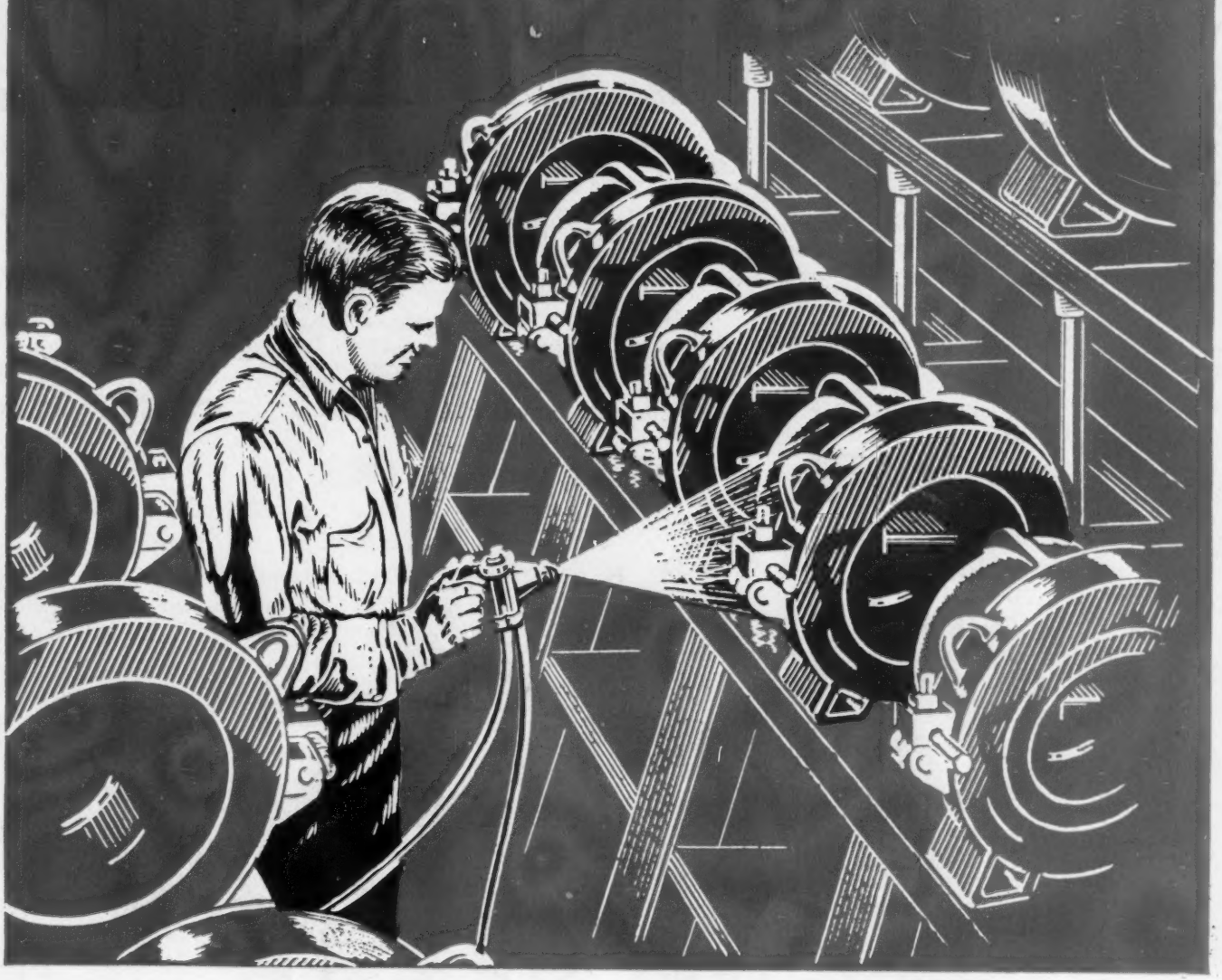
LAKE SUPERIOR IRON ORE
VESSEL TRANSPORTATION
COAL • FERRO ALLOYS
LUMP ORE

CCC

The Cleveland-Cliffs Iron Company

UNION COMMERCE BUILDING • CLEVELAND 14, OHIO

RUST PROTECTION
FOR ALL METAL SURFACES



with Tycol No-Rust-Ols

TYCOL
INDUSTRIAL LUBRICANTS

Boston • Charlotte, N. C.
Chicago • Detroit
Pittsburgh • Philadelphia
Tulsa • Cleveland

TIDE WATER ASSOCIATED OIL COMPANY
17 BATTERY PLACE · NEW YORK 4, N. Y.

"Easily applied—swab, dip or spray . . .
Prevents salt-spray corrosion . . .
Readily removed . . .
Approved for use on government material . . ."

Yes . . . the new Tycol No-Rust-Ols are powerful rust preventives, engineered for easy application on *all* metal surfaces. These performance-proved protective products eliminate surface rust formations on stock in storage . . . parts in production . . . and machinery awaiting use.

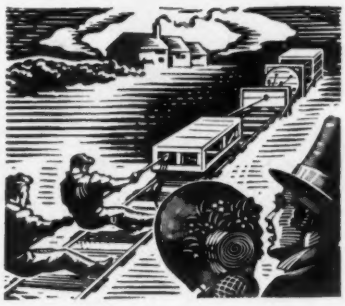
Your nearest Tide Water Associated office will give you the complete facts about the "rust protection" afforded by new Tycol No-Rust-Ols. Phone, write or wire us today.

LUBRICATION—"ENGINEERED TO FIT THE JOB"

CONFIDENCE...

Manufacturers of Wire Rope and Strand • Fittings • Slings • Screen, Hardware and Industrial Wire Cloth • Aerial Wire Rope Systems
Hard, Annealed or Tempered High and Low Carbon Fine and Specialty Wire, Flat Wire, Cold Rolled Strip and Cold Rolled Spring Steel • Ski Lifts

. . . . how much is it worth?



IN 1841, two years before the first telegraph line was installed in this country, and when there were but 27 states in the Union, John August Roebling was inspired with the idea of making a new kind of rope of unheard of strength and flexibility. His confidence in his idea caused him to risk everything he had on the development of his new rope.

How much is his confidence worth to Industry today, which couldn't turn a wheel without the modern wire rope?

Today, the John A. Roebling's Sons Company invests much time, effort and money in the development of improved products to keep alive the confidence of its many customers.

Roebling values this confidence as its greatest asset. That's why it offers you the greatest value for every dollar you invest . . . in *any* Roebling product.

HOW TO SAVE WIRE ROPE DOLLARS

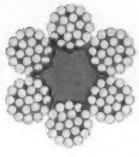
Wire rope is a machine of many parts and, like any machine, even the finest of wire ropes can be destroyed quickly through faulty installation or improper maintenance. To insure against this possibility, Roebling established its Field Engineering Service.

Every Roebling Field Engineer has a thorough knowledge of wire rope . . . its types, its uses, its features and limitations. This knowledge plus the experience he gains in his daily contacts can be a great asset to you . . . helping you solve those tough wire rope problems . . . giving you more service for each wire rope dollar.

Get to know your Roebling Field Engineer. Call him at your nearby Roebling Branch Office.

JOHN A. ROEBLING'S SONS COMPANY
TRENTON 2, NEW JERSEY
Branches and Warehouses in Principal Cities

FOR EXAMPLE—"BLUE CENTER" STEEL WIRE ROPE



Roebling entrusts your confidence in Roebling and Roebling products to the performance of its "Blue Center" Steel Wire Rope. It is the best rope Roebling knows how to make. It is available as preformed or non-preformed, in a complete range of sizes and constructions to meet a great variety of operating conditions. Its uses are almost unlimited and its performance is consistently economical.

Electrical Wire and Cable • Suspension Bridges and Cables
Aircord, Aircord Terminals and Air Controls • Lawn Mowers

ROEBLING

A CENTURY OF CONFIDENCE

Roll grinding setup with 60″x 312″ machine. Type 30 with travelling wheel carriage.

Faster ROLL GRINDING with *One Setup*

For Roughing and Finishing

The Landis Tool Type 30 Roll Grinder saves setup time and gives faster roll grinding because both roughing and finish grinding can be done with the same setup.

Roll is supported on two bearing type roll heads to assure concentricity of roll body with journals. The wheel is mounted on a carriage that traverses the length of the roll body. All controls are within convenient reach of the operator who rides the carriage. Rolls can be ground straight, crown or concave depending on the requirements of the job.

For full information on the design and construction of the Type 30 Roll Grinder, write for Catalog V41.

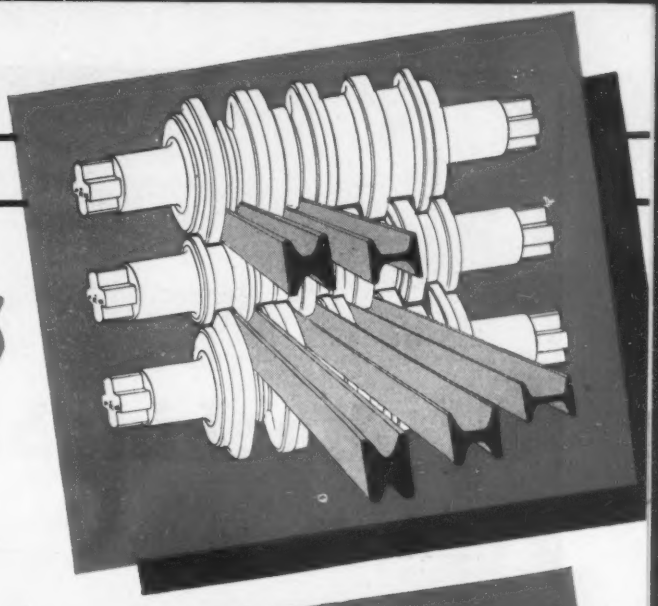
33A

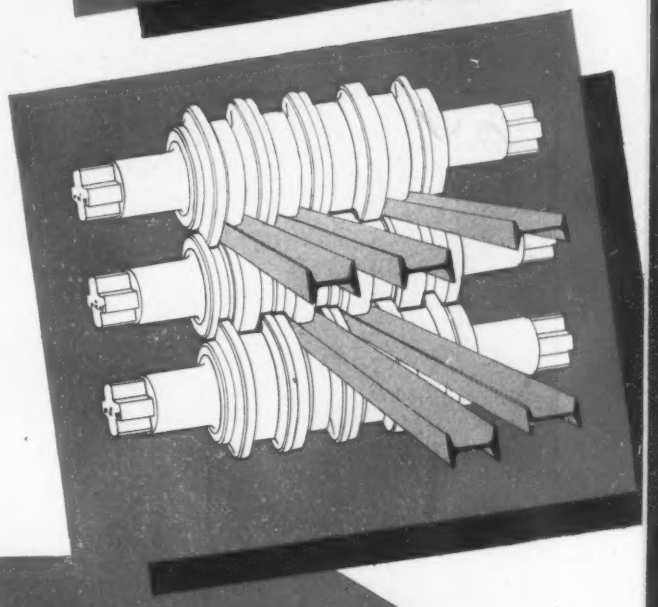
LANDIS TOOL COMPANY
WAYNESBORO, PENNSYLVANIA

LANDIS TOOL *Precision Grinders*

ROLLING TECHNIQUE ...

Standard Beams

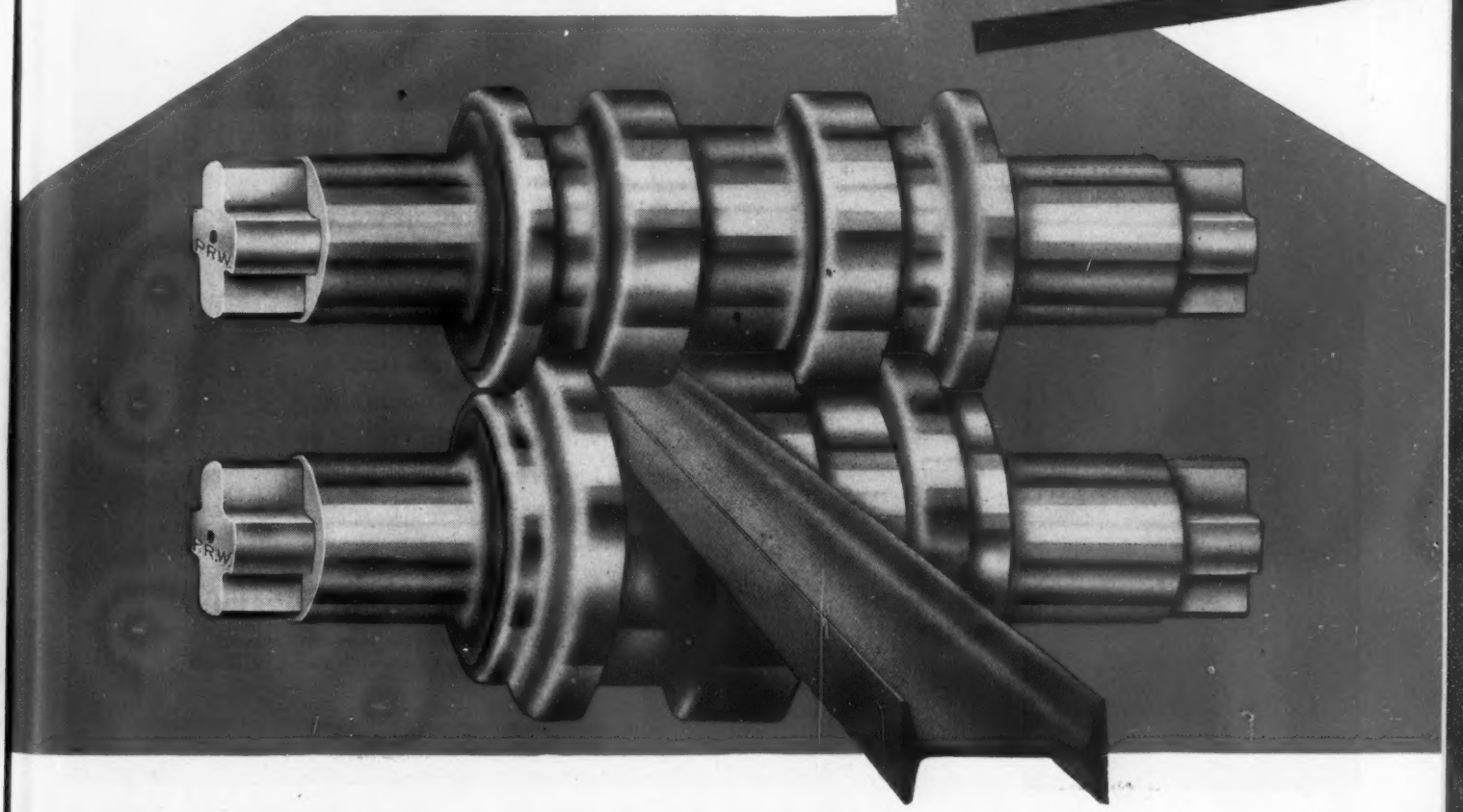




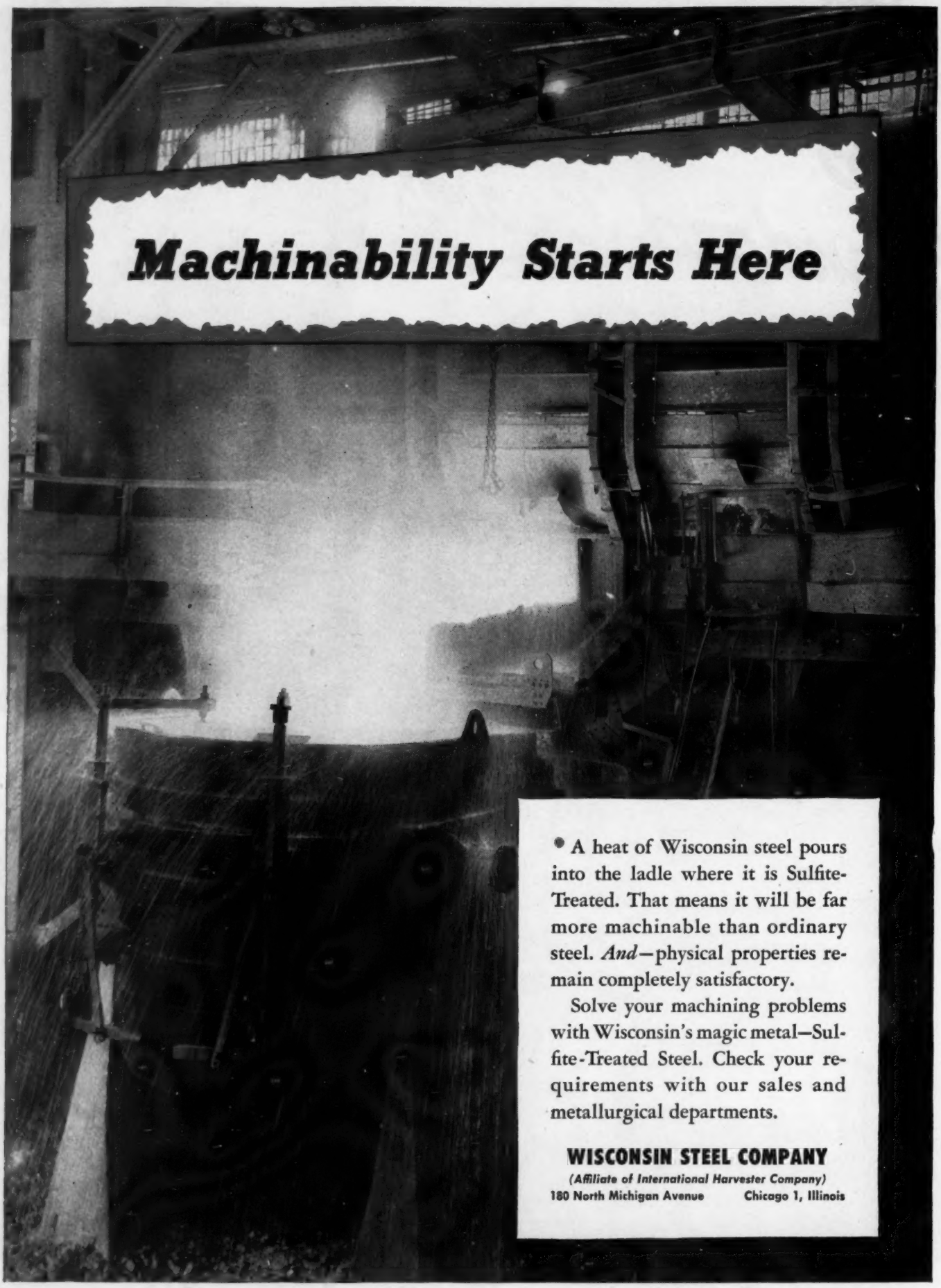
If it is the steel structure for a sky scraper, a warehouse, or a bridge, beams will furnish the main support. Whether it is a 3″ Beam or a 24″ Beam it will require deep passes cut into the rolls to form the flanges. Rolls with high tensile strength and resistance to side wear are required when rolling sections of this type.

Pittsburgh Rolls are made by skilled craftsmen whose thorough practical knowledge of metallurgy, foundry methods and accuracy in roll turning is the accumulated result of more than seventy-five years devoted to the exclusive manufacture of rolling mill rolls. The use of Pittsburgh Rolls can result only in *less cost per ton of steel rolled.*

PITTSBURGH ROLLS
Division of Blaw-Knox Company
PITTSBURGH, PA.



PITTSBURGH ROLLS

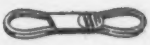

Machinability Starts Here
• A heat of Wisconsin steel pours into the ladle where it is Sulfite-Treated. That means it will be far more machinable than ordinary steel. *And*—physical properties remain completely satisfactory.
Solve your machining problems with Wisconsin's magic metal—Sulfite-Treated Steel. Check your requirements with our sales and metallurgical departments.
WISCONSIN STEEL COMPANY
(Affiliate of International Harvester Company)
180 North Michigan Avenue Chicago 1, Illinois

WISCONSIN SULFITE-TREATED STEEL

Quick Trick

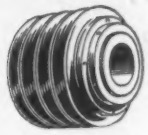
Just tighten three cap screws to lock this sheave to the shaft! No filing, reaming or hammering . . . no wobble.

TEXROPE .. Greatest Name in V-Belt Drives

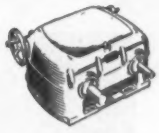


"Super 7" V-BELTS
Five Types — Sizes to suit every power transmission job.

Texsteel, Texdrive, "Magic-Grip"
— sheaves in a full range of sizes, grooves.



"Vari-Pitch" SHEAVES
Exact variations in speed, stationery or motion control.



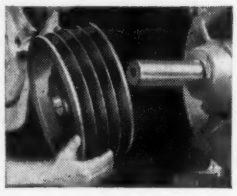
SPEED CHANGERS
Speed variations up to 375% at the turn of a crank.

ENGINEERING
Finest V-Belt engineering talent in the world—at your call.

TEXROPE "Super 7" V-Belts result from the cooperative research of two great companies — Allis-Chalmers and B. F. Goodrich. They are sold only by A-C.

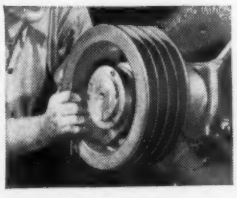
Save time . . . prevent damage to motor and shaft . . . with TEXROPE

"MAGIC-GRIP" SHEAVES



QUICKLY ALIGNED
Because it slides freely on the shaft, it's easy to line up the sheave accurately — for good alignment, smooth operating, longer belt life. It pays to standardize on "Magic-Grip" sheaves.
See Sweet's Catalog

SLIPS ON EASILY
Comes completely assembled. Tapered split bushing provides clearance for even over-size shafts — it's compressed and locked to the shaft with an all-around clamp grip by tightening three cap screws. Can be removed as easily as it goes on.



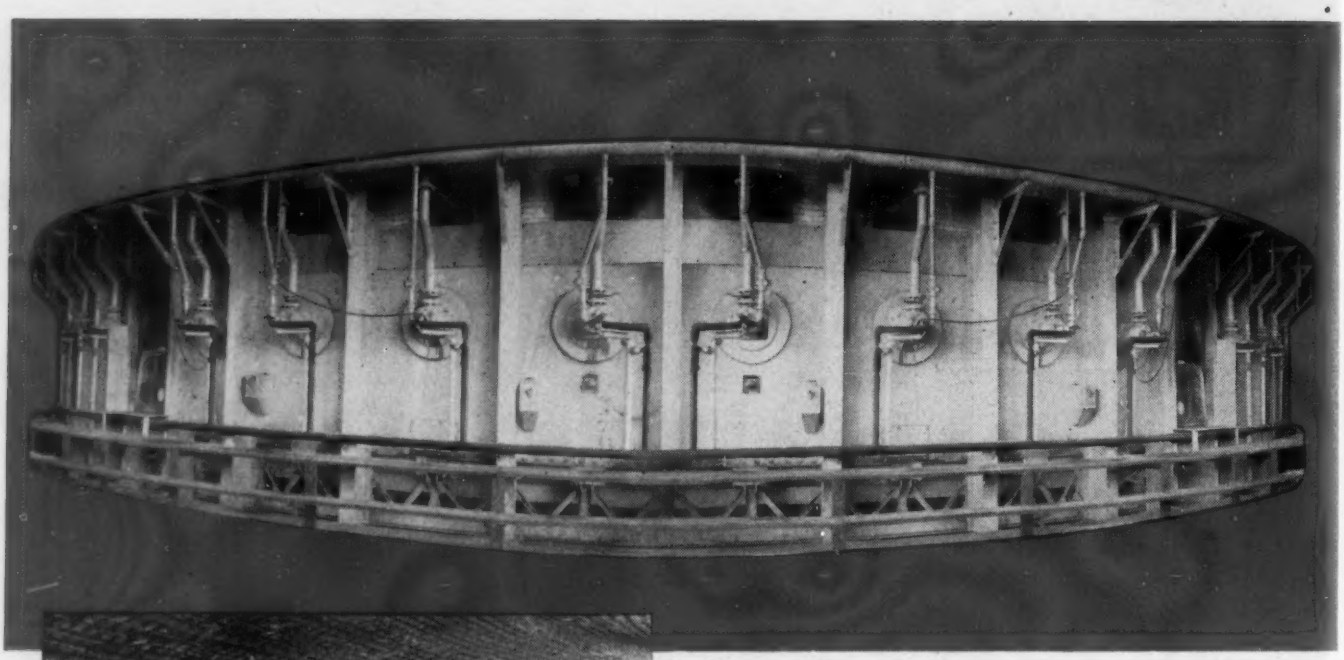
HERE'S A SHEAVE that goes on *fast*. Less labor cost — less downtime. But that's only part of the saving. There's no forcing or hammering to damage motor bearings — no set screws to mar the shaft. Locks on with a powerful clamp grip that prevents backlasn or wobble. And . . . it costs no more than a standard heavy duty sheave of comparable materials and precision workmanship.

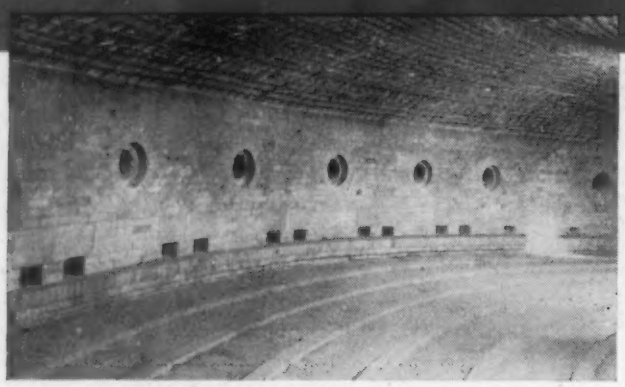
Texrope "Magic-Grip" sheaves are made in diameters from 5.4 to 48 inches, two to 12 grooves. They're engineered by Allis-Chalmers, originators of the multiple V-belt drive. For specifications, prices, call your nearest A-C dealer or office. ALLIS-CHALMERS, MILWAUKEE 1, WISCONSIN. A 2221

ALLIS-CHALMERS

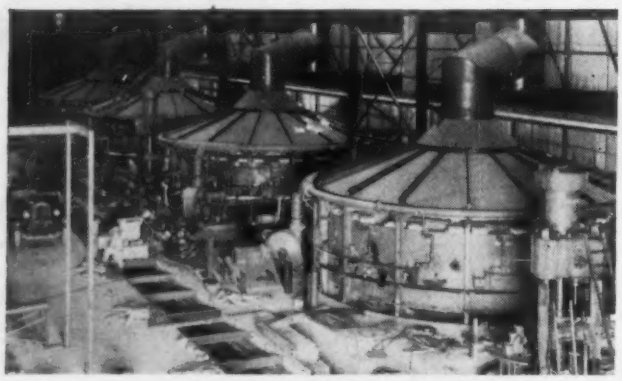
One of the Big 3 in Electric Power Equipment — Biggest of All in Range of Industrial Products

1847 1947
A CENTURY OF SERVICE to Industry THAT MADE America Great





Inside view after five years' service.



WHY THE WORLD'S LARGEST ROTARY FURNACES ARE SALEM BUILT

The main structural hearth is retained circular and independent of expansion in brick and steel by a Salem patented design.

Salem rotaries of all sizes incorporate this patented feature . . .

. . . this important feature with reliable and narrow band of control, over a wide range of temperature, should make this equipment just the thing for meeting your production requirements.

SALEM ENGINEERING CO. · SALEM, OHIO
SOUTHWEST OFFICE · FORT WORTH, TEXAS
SALEM ENGINEERING CO. (Canada) Ltd., TORONTO
SALEM ENGINEERING CO. Ltd., SHEFFIELD, ENGLAND

SALEM

ALL OFFICES STAFFED FOR ENGINEERING, CONSTRUCTION and OPERATION

Salem Builds

CIRCULAR SOAKING PITS
ROTARY HEARTH FURNACES
CONTINUOUS BUTT-WELD FURNACES
CAR BOTTOM FURNACES
FORGE FURNACES
HEAT TREATING FURNACES
NEEDLE METALLIC RECUPERATORS
AIR RECIRCULATING FURNACES
GAS ATMOSPHERE FURNACES
MECHANICAL EQUIPMENT FOR CHARGING AND DISCHARGING MATERIAL FROM FURNACES

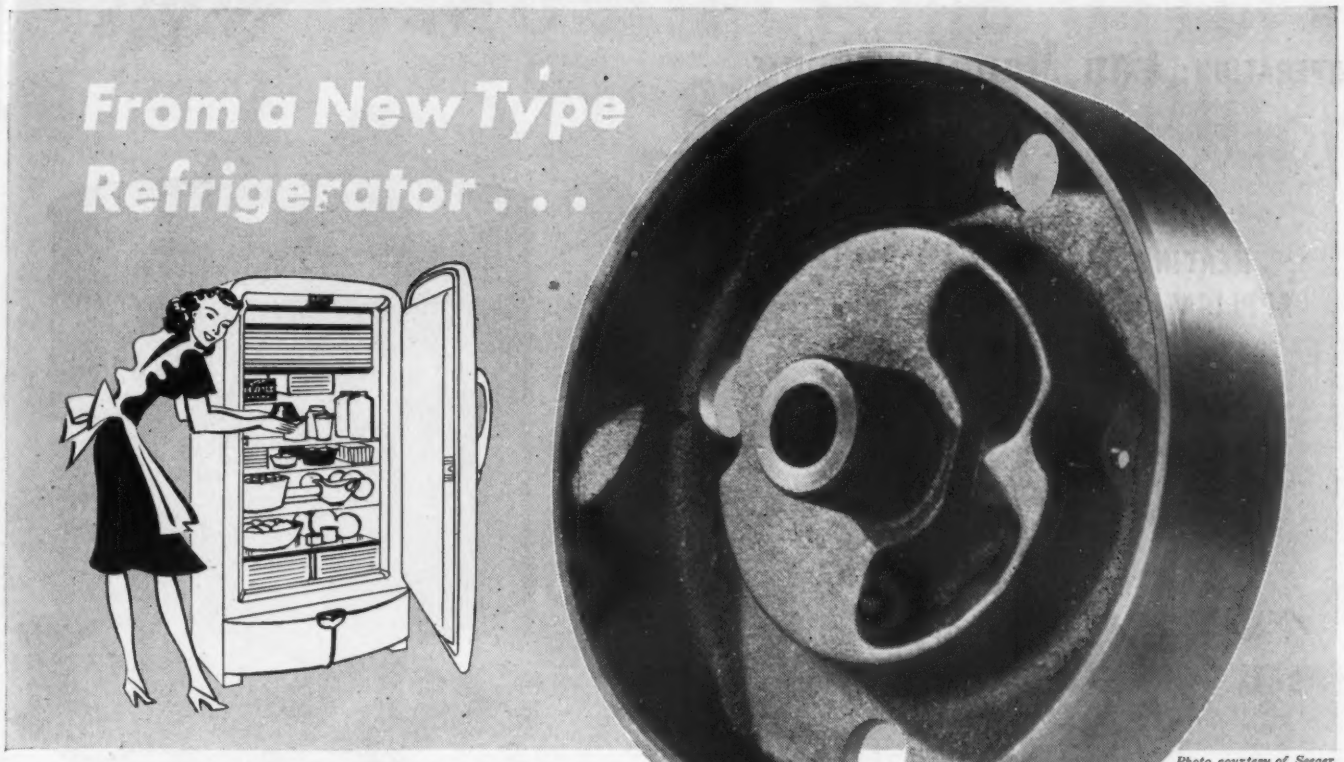


Photo courtesy of Seeger Refrigerator Company, manufacturers of the Coldspot Spacemaster.

COLD FACTS about the *Top Machinability* of CHATEAUGAY PIG IRON

Turning . . . drilling . . . internal and external grinding . . . tapping and threading . . . chamfering . . . milling . . . these are the machining operations performed on this compressor-head casting used in a revolutionary new-type refrigerator which utilizes every interior inch for food storage.

Why is it made of CHATEAUGAY? Here are the facts—taken from actual foundry production records: When made with ordinary pig iron, 52% of the castings were too hard for economical machining on a mass production basis . . . heat treating proved uneconomical because many became too soft and ultimately were scrapped.

With CHATEAUGAY, the picture has changed completely. Of more than 77,000 castings produced, only 1.5% were above hardness limits . . . and of these, all eventually passed rigid inspection.

This is but one of countless jobs in which the use of CHATEAUGAY Pig Iron has solved costly, troublesome foundry problems. A Republic Pig Iron Metallurgist will be glad to give you further facts and figures at your convenience. Just let us know when you would like him to call.

REPUBLIC STEEL CORPORATION
GENERAL OFFICES • CLEVELAND 1, OHIO
Export Department: Chrysler Building, New York 17, New York

Republic PIG IRON

"CHATEAUGAY"	"REPUBLIC"	"PIONEER"
Low-Phosphorus, Copper-Free	(Northern) Foundry, Basic and Malleable	(Southern) Foundry and Basic

REPUBLIC STEEL

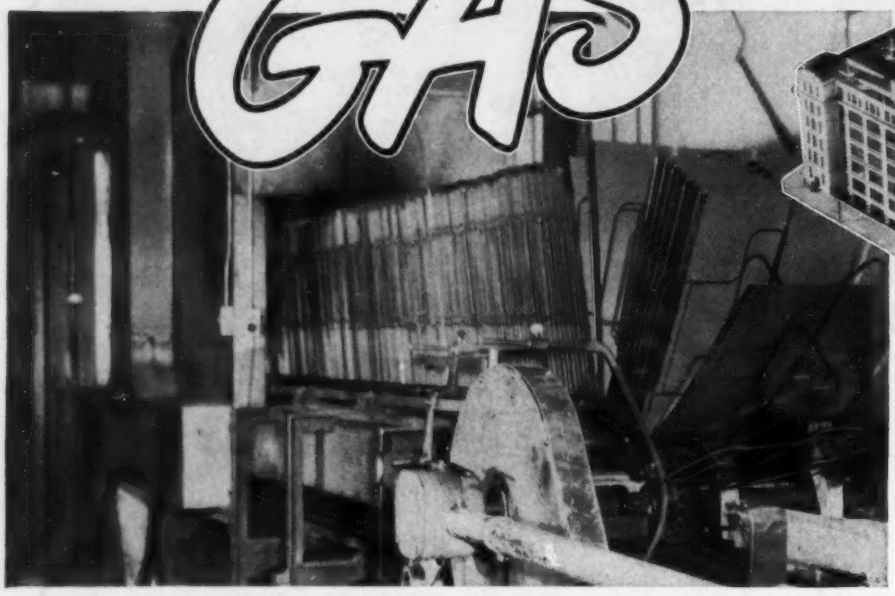
ALSO TRUSCON FOUNDRY FLASKS • REPUBLIC CORE WIRE • FOUNDRY NAILS

OPERATION: Can Manufacturing

HEATING APPLICATIONS:

- Joint Preheating
- Seam Soldering
- Enamel Coating
- Lithograph Drying

FUEL: GAS



Enamel-coated tinplate emerging from drying oven

American Can Company Plant, Brooklyn, N. Y.

The productive flames of GAS perform essential functions in the manufacture of cans for the foods and beverages packaged by the giant canning industry.

American Can Company's trademark is a familiar sight on the grocery shelf because so many of the best foods are preserved in CANCO cans. As a leading producer, American Can Company has developed streamlined equipment in which heat is a production tool and the heat source is GAS, the invariable choice of design engineers who require fuel flexibility.

For lithograph ovens where uniform temperatures are essential to maintain color tones, in body-making machines where the joint-seal requires pre-heating and solder-melting, in the tunnel ovens for enamel-drying, the remarkably precise controllability of modern GAS equipment is amply evident.

Labor-saving automatic controls, clean and pleasant working conditions, availability and dependability of supply make GAS the preferred fuel for all process heating. Your local Gas Company will recommend methods for applying GAS to your industrial processes.

MORE AND MORE...
THE TREND IS TO GAS
FOR ALL INDUSTRIAL HEATING

AMERICAN GAS ASSOCIATION

420 LEXINGTON AVENUE, NEW YORK 17, N. Y.

Now—MULTIPLY the UTILITY of SURFACE GRINDERS

Gain cylindrical grinding facilities with NEW No. 616 ATTACHMENT

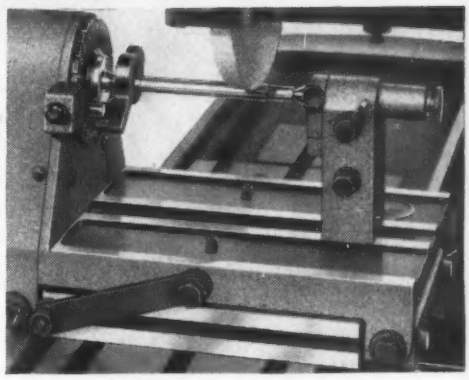
...We urge buying through the Distributor

● For dry grinding small cylindrical work, tapers and work requiring indexing, the new Brown & Sharpe Cylindrical Grinding and Indexing Attachment extends the usefulness of surface grinders. It saves time and expense and often makes unnecessary the installation of extra cylindrical grinding equipment.

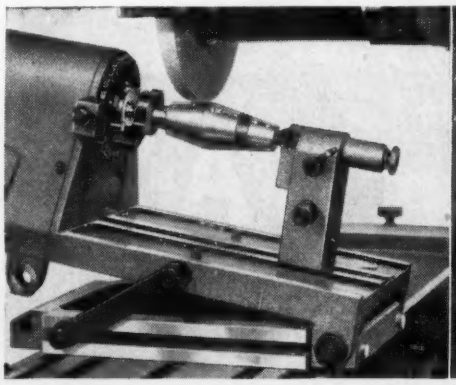
Straight cylindrical or tapered work is ground between centers or if ½" diameter or less, can be held in the indexing spring chuck. Indexing is performed with headstock index plate or with interchangeable indexing spring chuck.

Centers swing 6" diameter, take work 5¼" in length. Maximum grinding angle, 45°. 1/60 H.P., 115 V., A. C. motor is completely enclosed. Write for illustrated folder about the new time-and-money saving No. 616 Cylindrical Grinding and Indexing Attachment. Brown & Sharpe Mfg. Co., Providence 1, R. I., U. S. A.

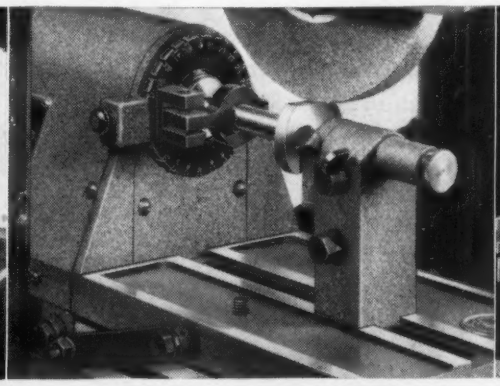
Visit our Booth 505 at Machine Tool Show, Dodge-Chicago Plant.



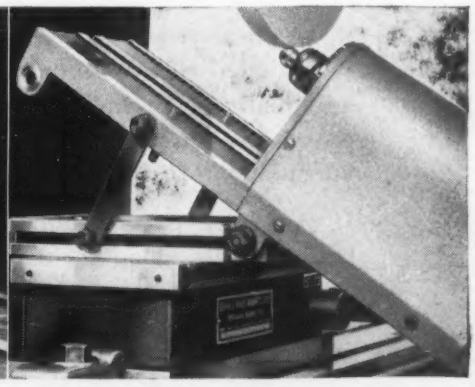
● Grinding work held between centers. Tailstock center is withdrawn for work change by simple swing of lever.



● Grinding taper shank. Attachment is adjustable to the desired taper.



● Grinding parallel flats using index plate. Index plate has 24 slots and is locked or released by plunger.



● Angular grinding of work held in spring collet. Attachment is held on permanent magnet chuck.

BROWN & SHARPE B·S

Bumpers and similar parts that require good cold-forming quality in steel are stronger and more economical to produce when made of N-A-X HIGH-TENSILE.

N-A-X HIGH-TENSILE's resistance to deformation (denting) is 60% greater than the denting-resistant quality in carbon steel. Its inherently fine grain and higher hardness provide a better surface texture for plating.

If you have parts requiring a combination of high strength, good formability and better surface texture, it will pay you to investigate N-A-X HIGH-TENSILE steel.

SAE 950 is synonymous with N-A-X HIGH-TENSILE STEEL

GREAT LAKES STEEL CORPORATION

N-A-X ALLOY DIVISION • DETROIT 18, MICHIGAN • UNIT OF NATIONAL STEEL CORPORATION

SHELL OIL CO. *Speeds Up Shipments* *with* PLYMOUTH LOCOMOTIVES

Car movements in the vast yards of the Shell Oil Company's Wood River Refinery have been simplified and speeded up by the constant use of a powerful, economical Plymouth Diesel Electric Locomotive.

Tank cars, or coal cars are no problem when Plymouth goes to work. Smoothly, easily with no wasted power, the Plymouth Locomotive easily hauls one car or twenty cars . . . fully loaded or empty. With Plymouth, moving and spotting cars for loading or unloading has become a time-saving operation with increased efficiency, ease of movement and lowered operating costs.

That's exactly what Plymouth Locomotives are designed to do . . . make your plant operations more profitable by increased efficiency in intraplant hauling. Write today for complete information. Plymouth Locomotive Works, Dept. A-1, Plymouth, Ohio.

PLYMOUTH LOCOMOTIVES

GASOLINE, DIESEL MECHANICAL AND DIESEL ELECTRIC

PLYMOUTH LOCOMOTIVE WORKS • Division of The Fate-Root-Heath Co., Plymouth, Ohio, U.S.A.

...AND LIKE IT!

"Practice what you preach" is an adage that has proved its worth at Pennsalt... especially at our Michigan works.

DOWNTIME SLASHED FROM 10 DAYS TO 10 HOURS!

At this plant, boiler descaling was previously done by mechanical turbining, involving shutdowns of ten days or more while the unit was being dismantled. A new method—built around our own Pennsalt PM-90 Descaling Compound—completed the entire job in *less than ten hours!* Descaling was more thorough than ever . . . in fact, Pennsalt PM-90 cleaned out pockets probably never cleaned before!

SEND FOR DETAILED REPORT ON THIS CASE!

If you are interested in technical facts on this case, write to address below for Case Report No. (62-8), which contains complete details. And if you have a problem in metal cleaning, plating, enamelling or corrosion-proof construction, call in one of our representatives and let him add our experience to your own.

PENN SALT
CHEMICALS
97 Years of Service to Industry

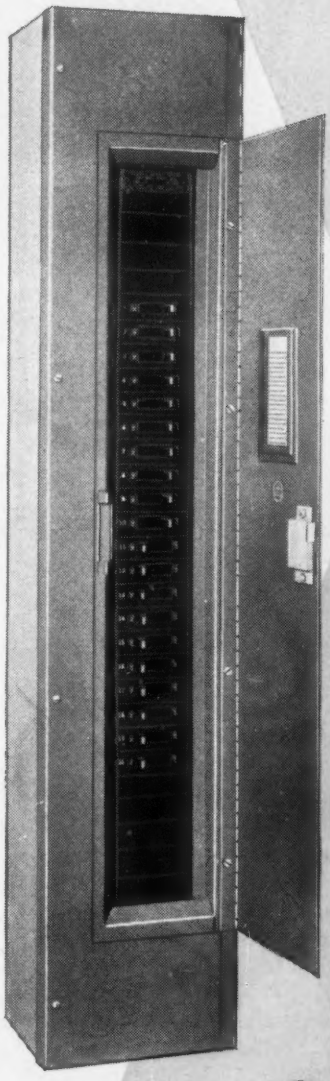
PENNSYLVANIA SALT MANUFACTURING COMPANY
SPECIAL CHEMICALS DIVISION, 1000 WIDENER BUILDING, PHILADELPHIA 7, PA.
NEW YORK • CHICAGO • ST. LOUIS • PITTSBURGH • CINCINNATI • WYANDOTTE • TACOMA

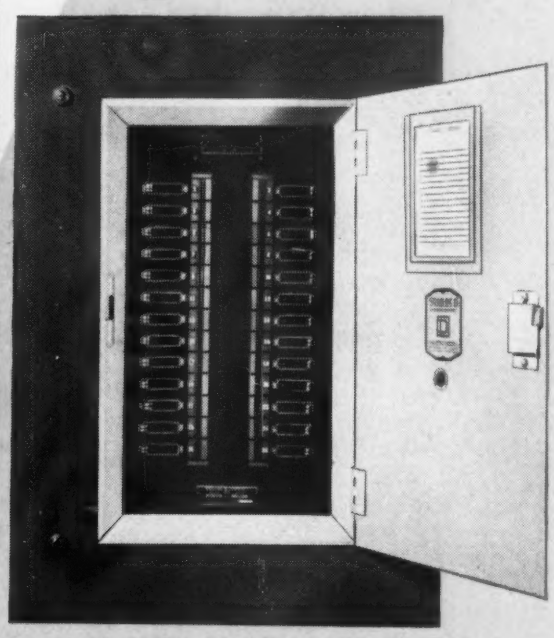
NOW! NY1B PANELBOARDS

for 277 VOLT FLUORESCENT LIGHTING

with 10,000 Ampere Interrupting Capacity Breakers

PART OF THE PARADE OF NEW DESIGNS





IT IS NO LONGER NECESSARY to operate 277 volt fluorescent lighting circuits on "pepped-up" 125 or 250 volt circuit breakers having only 5000 ampere interrupting capacity. Full 10,000 ampere interrupting capacity at 277 volts is now required by Underwriters' Laboratories. The new Square D ML breakers, designed for this service, are now available to meet these requirements.

• NY1B panelboards employing these ML breakers in 15 and 20 ampere ratings are made for either wall or column mounting, for 277/480 volt 3 phase, 4 wire systems. Both breakers and NY1B panelboards are Underwriters' approved. They also meet Federal Specifications WP131A for Class 1 panelboards equipped with circuit breakers.

• Standard panelboards up to 42 circuits are arranged in boxes 20" wide. Narrow column type panelboards up to 28 circuits are in boxes 8⅝" wide.

***Visit Us** at The Machine Tool Show • Chicago, Sept. 17-26 • Booth 678*

***Write** for complete information on NY1B Panelboards . . .*
SQUARE D COMPANY, 6060 Rivard Street, Detroit 11, Michigan

SQUARE D COMPANY

DETROIT • MILWAUKEE • LOS ANGELES

SQUARE D CANADA, LTD., TORONTO, ONTARIO • SQUARE D de MEXICO, S.A., MEXICO CITY, D.F.

OXYGEN

The Biggest Quantities in History...
The Lowest Cost You Ever Heard Of

Stacey-Dresser Engineering has designed and is supervising the construction of the largest oxygen producing plant ever built for the chemical industry.

We are ready to serve the gas, oil, chemical and steel industries with oxygen plants. These plants are ordinarily built to produce 95% pure oxygen, can also be built to produce a sidestream of 99.5% pure oxygen. Or, to produce 99.5% pure oxygen entirely.

Plant capacities from 10 tons to 1000 tons a day.

The cost of producing oxygen—now $5 a ton* for small plants: much less for large plants.

*Ton O_2 = 24,000 cu. ft. standard conditions.

PLEASE ADDRESS INQUIRIES TO:

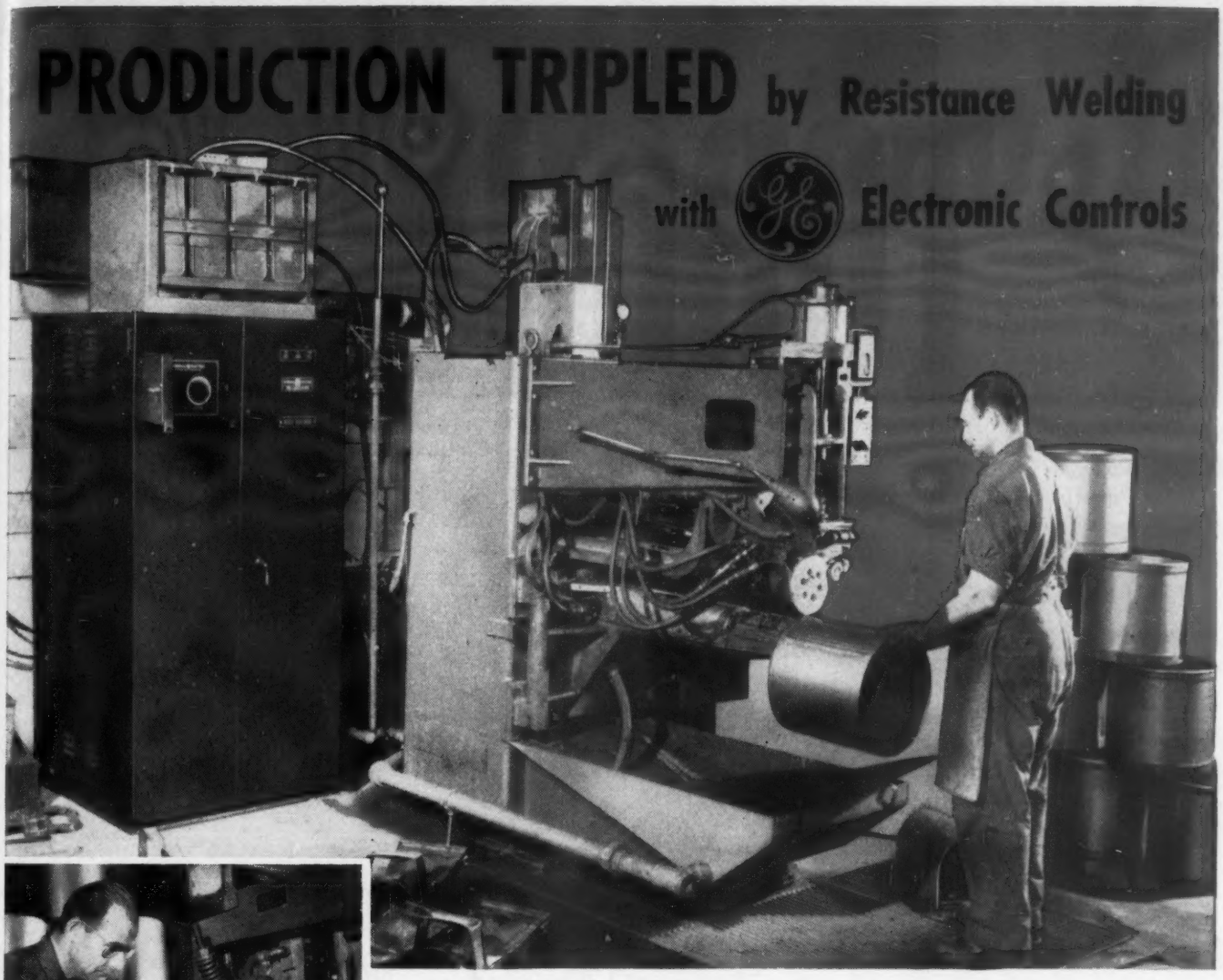
Stacey Dresser Engineering

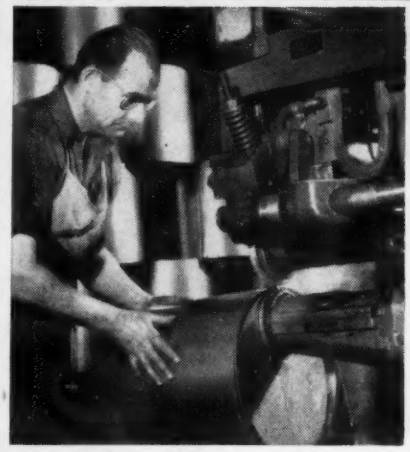
1900 SUPERIOR AVENUE • CLEVELAND 14, OHIO

A DIVISION OF STACEY BROTHERS GAS CONSTRUCTION COMPANY

ONE OF THE DRESSER INDUSTRIES

PRODUCTION TRIPLED by Resistance Welding with G-E Electronic Controls





By shifting from acetylene welding to resistance welding with G-E controls, Tarrant Manufacturing Co., Saratoga Springs, N. Y., has tripled their production of road maintenance equipment.

Actual increase in production rate is even greater. It took three minutes to acetylene weld the bottom seam of the roofer's bucket pictured above; now, it takes 20 seconds. G-E controls assure automatic and accurate timing of the welding cycle; thus, faster, more consistent welding.

Large Welder Operates on Low-capacity Power Lines . . . Thanks to Series Capacitors

No Large Voltage Drop . . . Unity Power Factor

This large welder operates on low-capacity power lines, with no large voltage drop, thanks to G-E series capacitors. They reduce the normal welder demand from 100 kva to 40 kva, and correct the power factor to unity. There is no light flicker in the plant or surrounding residential area. For details on series capacitors, ask for Bulletin, GET-1134.

New Lines of Synchronous and Nonsynchronous Controls

1. Control is factory-assembled in one, easy-to-install cabinet.
2. Easy servicing through large side door of cabinet.
3. Control station always faces operator.

For further details, ask for Bulletins GEA-4699 and GEA-4726.

HAVE YOU SEEN

"This Is Resistance Welding", G.E.'s 30-minute, full-color movie? Your nearest G-E office, local utility, or resistance welder manufacturer representative will be glad to arrange a free showing.

GENERAL ELECTRIC

Apparatus Department, Sec. A645-43
General Electric Company
Schenectady 5, New York

Please send me the following bulletins:

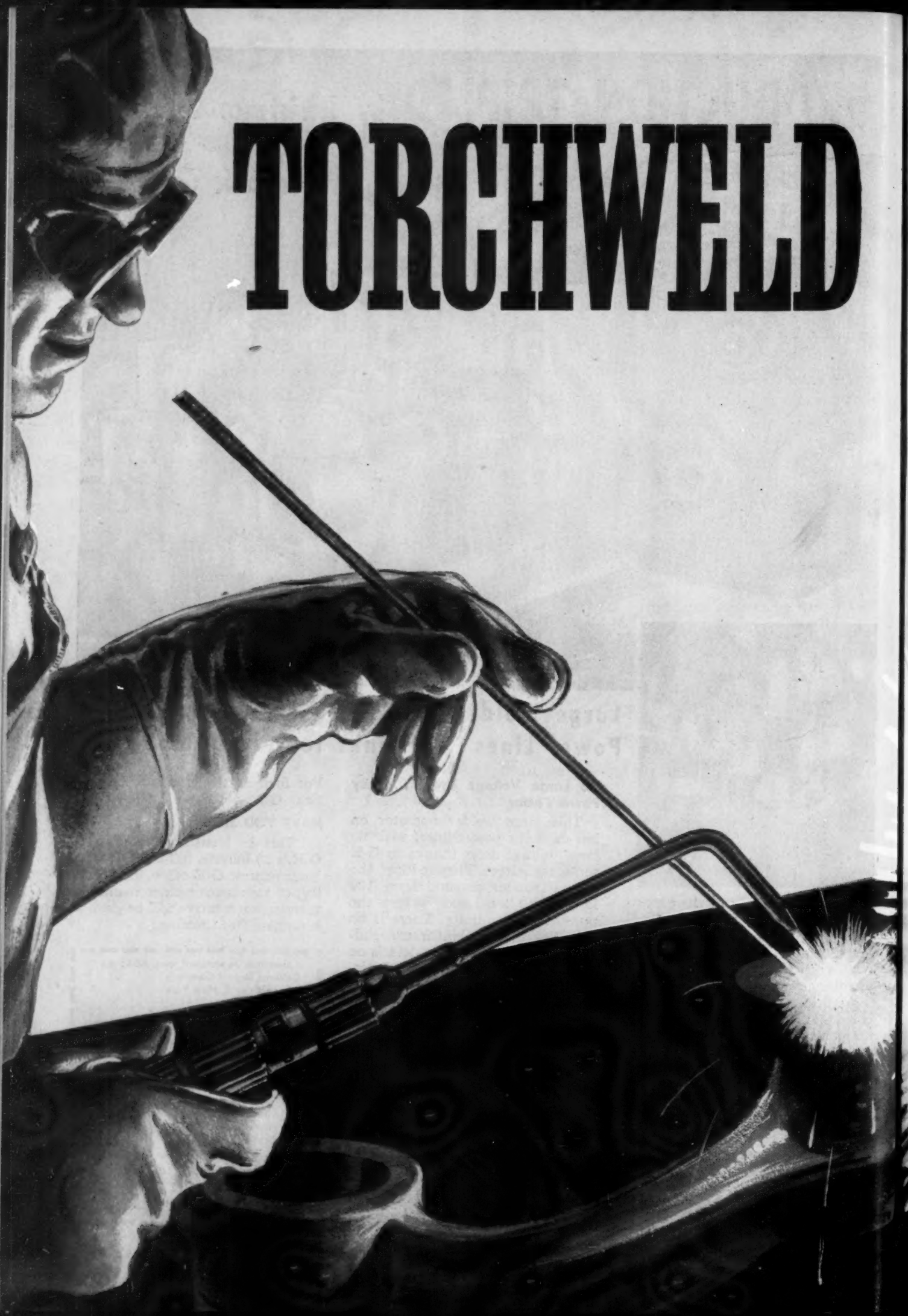
- ☐ GEA-4699, Synchronous Precision Control for Spot and Projection Welding
- ☐ GEA-4726, Nonsynchronous Control for Spot and Projection Welding
- ☐ GEA-4571, The Importance of Control
- ☐ GET-1134, Application of Series Capacitors to Resistance Welding Machines

Name.....

Company.....

Address.....

TORCHWELD



built right!
works right!
priced right!

NCG

EVERYTHING FOR WELDING

NCG is recognized as one of the largest organizations of its kind in the world. It operates 73 manufacturing plants within the United States, offers supply and service by a vast network of hundreds of independent NCG distributors and warehouse stocks. For assured satisfaction in *your* welding and cutting needs . . .

RELY ON NCG

When the question is asked, as it often is, "Why *does* Torchweld out-perform, out-wear and out-save other makes of flame welding and cutting equipment?" —the answer is always the same. "Torchweld was designed by the welders of America *themselves*—and they knew what they wanted."

It's a fact. You see . . . NCG's active, interested field men are unceasing students of America's technical methods. In shops and plants, large and small—from coast to coast, they're in *constant* contact with America's technical problems—where welding is applicable.

So NCG's busy laboratory in Chicago is a daily clearing house of what's new and what's obsolete, of what's good and what's bad—in *both* flame and electric arc welding.

Here then, in this NCG nerve-center of nation-wide research, the expressed needs of a nation are combined with NCG's 30 years' experience in welding —to make Torchweld the line that incorporates *every* scientific advancement and *keeps abreast* of technical progress.

Take the "Spirex" nozzle element that stops seat ignition in regulators for high pressure gases. It's an exclusive feature of the Torchweld "5900" heavy duty single stage regulator—and it's characteristic of the *ingenuity* in the Torchweld line. The "Stab-L-Flow" mixer that stabilizes the flame on Torchweld welding torches, and prevents backfire, is another special Torchweld development *you* will want to know more about.

Yes . . . safety—simplicity of maintenance—ease in use—economy—these are all Torchweld virtues that are winning new friends every day for Torchweld, and will win you too. Indeed Torchweld *is* built right, works right and is priced right! Send today for the new, complete Torchweld catalog, and see for *yourself.*

NATIONAL CYLINDER GAS COMPANY
840 N. MICHIGAN AVE., CHICAGO 11, ILL.

New SIMOMETER

"Dials you in" on LOWER HACKSAW COSTS

with SIMONDS "Red End" BLADES

SECRET of straighter, smoother cuts and longer blade-life is ACCURATELY TESTED TENSION.

NEW SIMONDS *SIMOMETER* enables you to tension any size blade correctly in a matter of seconds . . . and so get top cutting performance out of the top brand of blades — SIMONDS "Red End".

SEE HOW *SIMOMETER* SAVES SAW-DOLLARS! A Simonds Saw Specialist will demonstrate — on your own hacksaw machines — this easy-to-read tension tester. NO OTHER METHOD LIKE IT. Just call your distributor or the nearest Simonds office.

SIMONDS
SAW AND STEEL CO.
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SIMONDS	SIMONDS	SIMONDS
Special Electric Furnace Steels	Grinding Wheels and Grains	Simonds Products for Canada

BRANCH OFFICES: 1350 Columbia Road, Boston 27, Mass.; 127 S. Green St., Chicago 7, Ill.; 416 W. Eighth St., Los Angeles 14, Calif.; 228 First St., San Francisco 5, Calif.; 311 S. W. First Avenue, Portland 4, Ore.; 31 W. Trent Ave., Spokane 8, Wash. *Canadian Factory:* 595 St. Remi St., Montreal 30, Que.

How Many Bearings in Your Plant?

Trabon Lubrication Systems can Save You $5 to $8 per bearing per year!

IT'S a matter of simple arithmetic. Each bearing requires at least one minute per day of your lubricating man's time. At prevailing wage rates you are paying at least 1.7¢ per day for once-a-day lubrication of each bearing. Multiplied by 300 working days a year *each bearing is costing you $5.10 per year in man-hours alone!*

Trabon Centralized Lubricating Systems will put this money back in your pocket. Hundreds of bearings can be lubricated in a few moments' time, positively, accurately. And there are other savings, too. Trabon Systems eliminate "down-time" for lubrication. Machinery is lubricated while it is in operation. Bearing repair bills are slashed. Breakdowns and expensive lost production time are eliminated. Lubricant is used more efficiently. *These savings add up to anywhere from $8 to $10 per bearing per year on the average machine.*

Take an ordinary press with 20 lubricating points. In a year's time—at $8 per bearing—you save at least $160. *At that rate your Trabon System will completely pay for itself in considerably less than two years!*

Trabon Systems are in daily use on blast furnaces, cranes, conveyors, coal crushers, canning and bottling machinery, machine tools, mills, and mill tables, manipulating and handling equipment, ore bridges and unloaders, presses and forging equipment, rubber mills and mixers—in fact anywhere that bearings require systematic lubrication. Let Trabon's generation of experience in industrial lubrication help solve your lubricating problems. Use the attached business reply card for more information on Trabon Positive Centralized Lubricating Systems.

Trabon ENGINEERING CORPORATION
1814 EAST 40TH STREET • CLEVELAND 3, OHIO
INDUSTRIAL LUBRICATION EXCLUSIVELY SINCE 1922

5 WAYS Trabon POSITIVE LUBRICATION WILL PUT MONEY IN YOUR POCKET

1. Eliminate Bearing Repair Bills
2. Eliminate Lost Production from Bearing Breakdowns
3. Reduce Lubricating Man-Hours
4. Eliminate "Down-Time" for Lubrication
5. Reduce Lubricant Consumption

Mail this card today, it needs no postage

TRABON ENGINEERING CORPORATION
1814 East 40th Street • Cleveland 3, Ohio

Please send me more information on Trabon Positive Lubricating Systems. I am particularly interested in lubricating

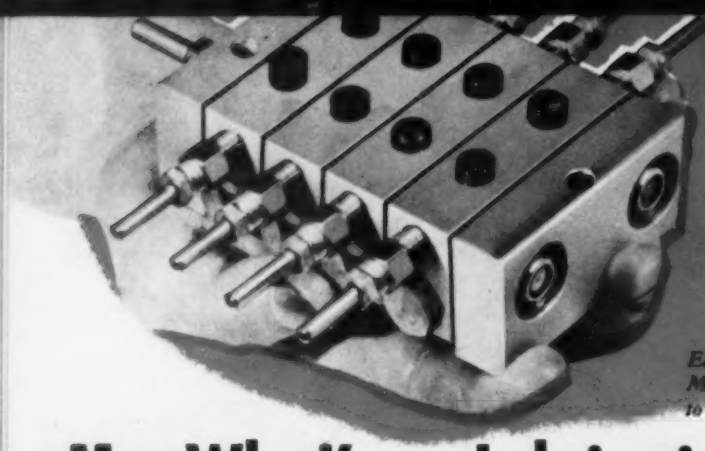
_____

Name_____ Title_____

Company_____

Address_____

City and State_____



Each husky, steel Trabon M Feeder can serve up to 22 bearings.

Men Who Know Lubricating Systems *Specify Trabon*

Check these Operating Features and you'll realize why plant engineers and master mechanics prefer Trabon

1. **All-Hydraulic Operation**—Feeder measuring pistons are positively actuated by hydraulic flow of lubricant and do not rely on spring operation.

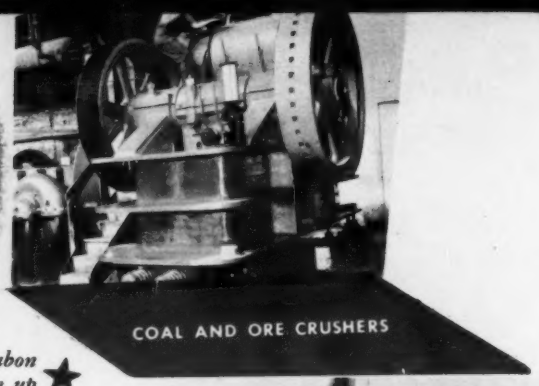
2. **Progressive Operation**—Feeder sections operate progressively, one after the other. Each piston discharges its full measured amount of lubricant before the main hydraulic flow from the pump can reach and operate the next piston. *This makes it impossible to skip or under-lubricate a bearing.*

3. **Only One Indicator to Watch**—The single indicator at the pump tells the whole story, giving positive proof when *every* bearing has received its full measured amount.

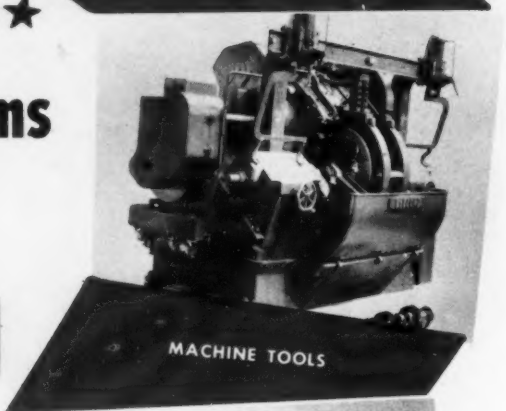
4. **Rugged, Steel, Sealed Feeders**—vibration-proof, heavy steel feeders are completely sealed and have no exposed moving parts. The sealed Trabon System can be buried underneath dirt, grime, coal dust or even concealed inside the machinery. For the single indicator at the pump tells the story!

5. **Wide Range of Discharges**—Trabon Feeders can provide extreme variations in lubricant discharges. A complete line of manual and automatic pumps meets the needs of lubricating systems of all sizes and types.

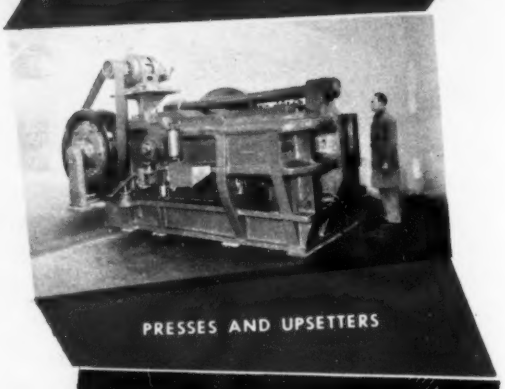
Let Trabon's Generation of Experience
Help Solve Your Lubricating Problems



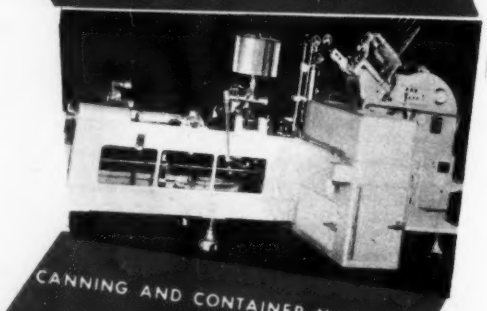
COAL AND ORE CRUSHERS



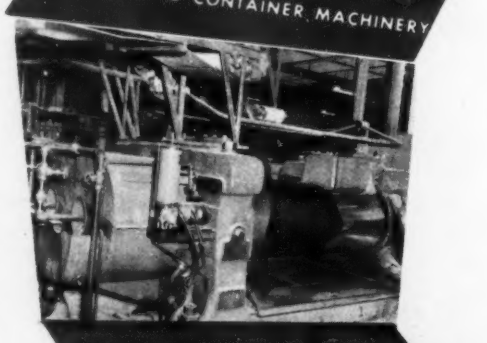
MACHINE TOOLS



PRESSES AND UPSETTERS



CANNING AND CONTAINER MACHINERY



RUBBER MILLS AND BANBURYS

STEEL MILL EQUIPMENT

FIRST CLASS
PERMIT No. 4736
(Sec. 510, P. L. & R.)
CLEVELAND, OHIO

BUSINESS REPLY CARD
No Postage Stamp Necessary If Mailed in the United States

2¢ POSTAGE WILL BE PAID BY—

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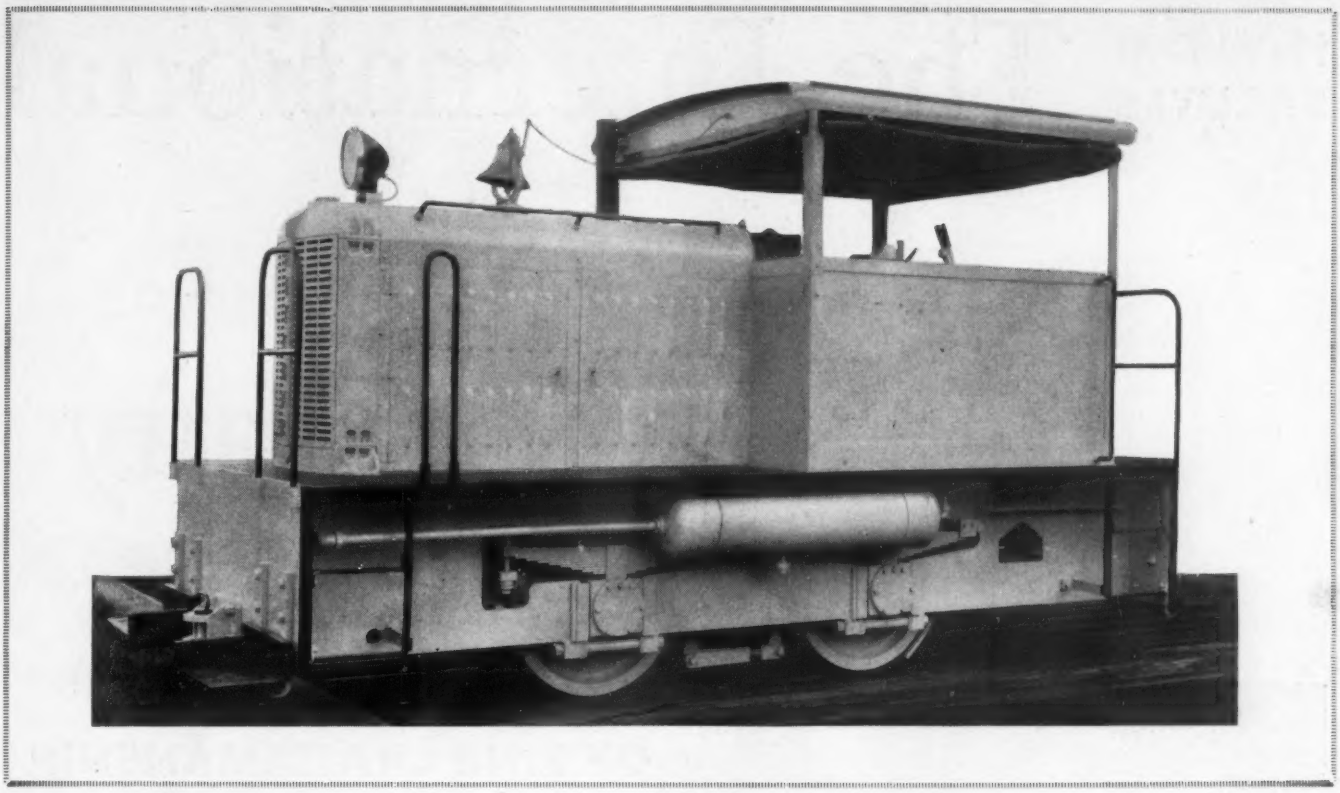


DERAILMENTS MEAN LOST TIME AND MONEY

"On the ground" situations seldom apply to Whitcomb Locomotives. They actually seem able to follow the rails anywhere. Sharp curves, temporary road beds, light rail, uneven or rough tracks hold no fear for these versatile work horses. Scientifically designed, the weight of each Whitcomb locomotive is evenly distributed with a remarkably low center of gravity.

Many Whitcomb Diesel mechanical models with rigid wheel bases as illustrated are equipped with 3 point spring suspension providing cross equalization. This arrangement enables the wheels to conform to the vertical irregularities of the track, reducing the possibility of derailment by preventing too great a concentration of weight upon one rail. It also permits maximum adhesion and greater tractive effort, because all the wheels remain in contact with the rails all of the time.

So for tough car spotting, hauling or switching assignments involving rough trackage, where larger, heavier locomotives would be flirting with trouble—better send a Whitcomb to do the job quickly and economically.

Diesel Locomotives, Electric drive 25 to 95 tons
Mechanical or Hydraulic drive 3 to 30 tons

BLW
THE BALDWIN GROUP

THE WHITCOMB LOCOMOTIVE CO.

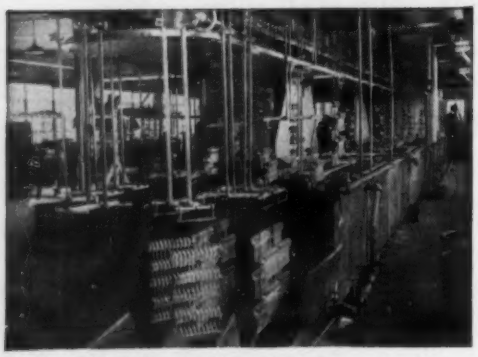
ROCHELLE, ILL.

Subsidiary of THE BALDWIN LOCOMOTIVE WORKS

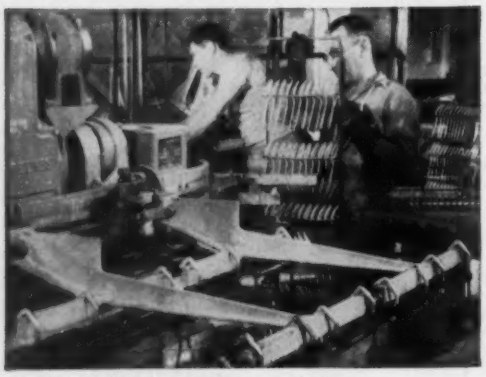
H-VW-M SALUTES

The International Silver Company

1847 ROGERS BROS. COMPLETES 100 YEARS OF FINE CRAFTSMANSHIP



H-VW-M Full Automatic Conveyor in International Silver's 1847 Rogers Bros. plant, Meriden, Conn. Flatware shown during preliminary work of cleaning, rinsing, and the silver "strike," prior to the silverplating operation in adjacent H-VW-M Semi-Automatic Conveyors.



One of three H-VW-M Semi-Automatic Plating Conveyors. This specially built equipment has multiple agitation features which, with scientific control, assure uniform distribution of pure silver. Work is oscillated in three distinct motions—continuous chain travel moves racks of flatware forward, while entire mechanism is given both longitudinal and transverse reciprocating motions.

Five generations of experienced craftsmen have contributed to the beauty, quality and richness of International Silver's 1847 Rogers Bros. Silverplate. The sculpturing, high raised relief, beautifully wrought detail, are all the results of painstaking attention to the smallest details of manufacturing and processing. Yes, from the base metal to the finished piece, The International Silver Company demands—*and gets*—the best in materials and equipment.

Hanson-Van Winkle-Munning Company has consistently supplied electroplating equipment and supplies to The International Silver Company, and both names are synonymous with the evolution and growth of the electroplating industry. Since the beginning of commercial electroplating H-VW-M has contributed fundamental developments, originated new processes, equipment and supplies which have helped to bring the plating industry to its present high status.

HANSON-VAN WINKLE-MUNNING CO. · MATAWAN, NEW JERSEY, U.S.A. · SINCE 1820

HANSON-VAN WINKLE-MUNNING COMPANY

MATAWAN, NEW JERSEY

Manufacturers of a complete line of electroplating and polishing equipment and supplies

PLANTS: **MATAWAN, NEW JERSEY · ANDERSON, INDIANA**

SALES OFFICES: **ANDERSON · CHICAGO · CLEVELAND · DAYTON · DETROIT · GRAND RAPIDS MATAWAN · MILWAUKEE · NEW HAVEN · NEW YORK · PHILADELPHIA · PITTSBURGH · ROCHESTER SPRINGFIELD (MASS.) · STRATFORD (CONN.) · SYRACUSE**

you can save money on your machining costs

★ Two means remaining for reduction in manufacturing costs are increased production per machine and decreased tool maintenance expense, both of which are possible thru the introduction of Footburt Surface Broaching methods. Each application is individually engineered for easy, fast loading and efficient broach tooth arrangement that makes long runs between grinds possible. We will gladly work with you on your production problems. Just send parts prints and information on hourly production required.

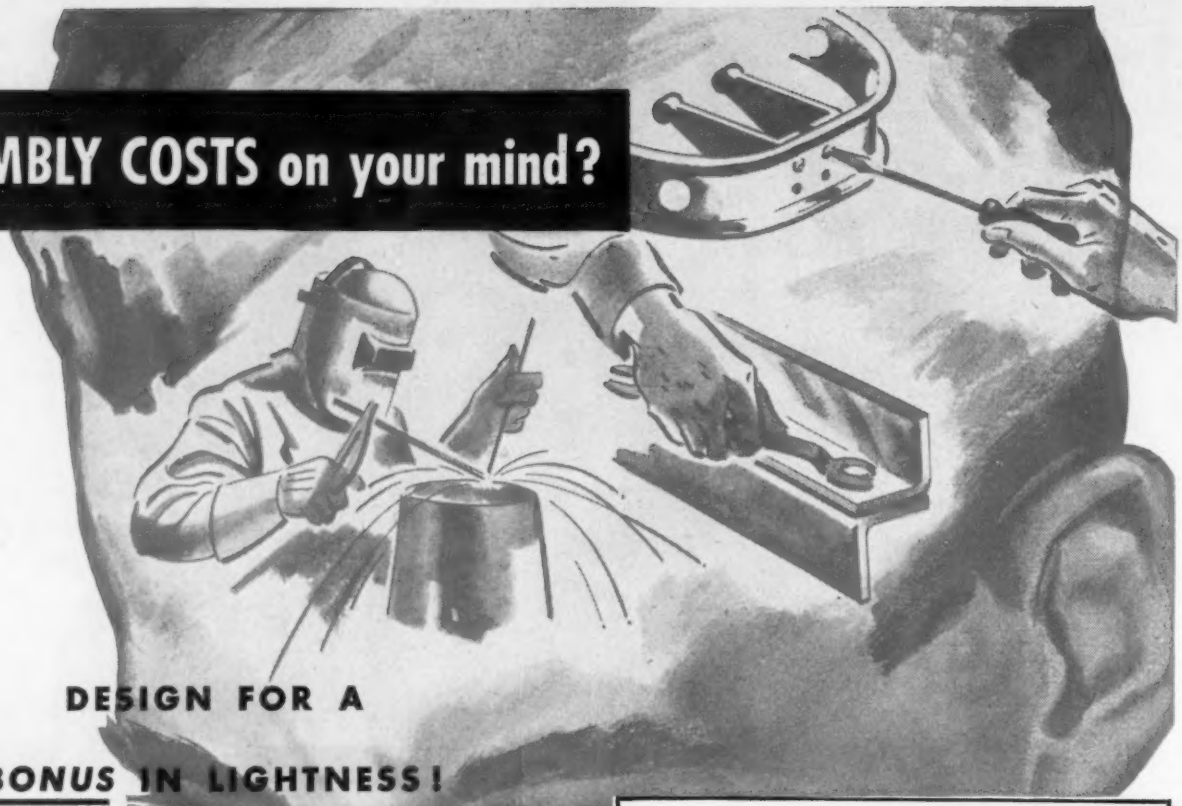
THE FOOTE-BURT COMPANY • Cleveland 8, Ohio

Detroit Office: General Motors Building

FOOTBURT *Surface Broaching*

FOOTBURT PATENTED TOOTH FORM

ASSEMBLY COSTS on your mind?

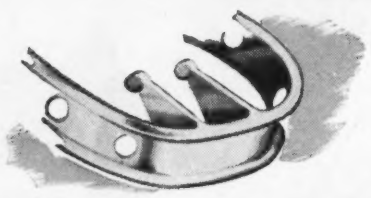


DESIGN FOR A *BONUS* IN LIGHTNESS!

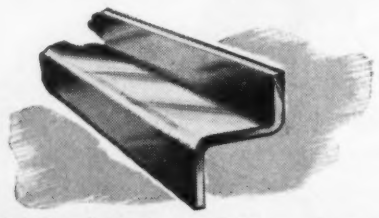
Many American Magnesium products not only simplify assembly, but give *your* product a bonus in lightness besides! For American Magnesium is 35% lighter than aluminum, 75% lighter than steel!

You should know these semi-fabricated forms of American Magnesium, and the ease with which they can be applied to your design problems. And you should take full advantage of the 59 years of light-metal know-how of Aluminum Company of America, that stands ready to help.

At the right, are indicated the forms of American Magnesium that can simplify assembly problems in your plant. To answer the questions of their application, call your nearest Alcoa sales office, or write ALUMINUM COMPANY OF AMERICA, sales agent for American Magnesium products, 1721 Gulf Building, Pittsburgh 19, Pennsylvania.



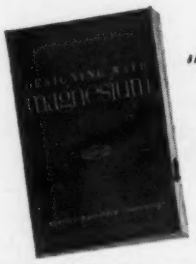
ASSEMBLY OF stamped or cast parts may be simplified by an American Magnesium Permanent-Mold Casting. A single, high-speed cut brings it to desired finish and dimensions.



BUILDING UP of complex assemblies can be avoided with the use of American Magnesium Extrusions. Made to desired profiles. Die cost is low.

MAGNESIUM MAZLO PRODUCTS
Reg. U.S. Pat. Off.

AMERICAN MAGNESIUM CORPORATION



DO YOU HAVE "DESIGNING WITH MAGNESIUM?"

This book belongs on the desk of every up-to-date designer. Full details of how to specify; choice of fabrication; physical, chemical, and thermal properties; shop practices; how to design. Sent free on request.

SUBSIDIARY OF ALUMINUM COMPANY OF AMERICA

Speed 2nd Operation Work

SOUTH BEND
PRECISION TURRET LATHES

South Bend Precision Turret Lathes are specifically designed for the quantity production of small parts. The turret head is so constructed that it will index within plus or minus .0005", measured 4" from turret face. Fast and easy to handle, these lathes give full freedom to the operator's producing power. There is no excessive mass or weight in moving parts to slow down operations and cause fatigue. Yet, South Bend Turret Lathes have the rigidity and power for rapid production on all work within their capacity. They are made in three sizes: Series 900, 1000, and 2-H—see specifications at left.

SPECIFICATIONS	SERIES 900	SERIES 1000	SERIES 2-H
Hole Through Spindle	¾"	1⅜"	1⅜"
Collet Capacity	½"	1"	1"
Swing Over:			
Bed and Saddle wings	9¼"	10⅛"	16¼"
Double Tool Slide	3 9/16"	3 9/16"	6⅞"
Compound Slide	5½"	5⅞"	—
Turret Tool Feed	4"	4"	6⅛"
Turret Face to Spindle, Maximum Distance	20⅝"	19⅜"	40¼"
Tool Slide Travel	3⅝"	3⅜"	9¾"
Thread Cutting Range, 48 Threads	4 to 224	4 to 224	4 to 224
Carriage Power Feeds:			
Longitudinal, 48	.0015" to .0853"	.0015" to .0836"	.0015" to .0841"
Cross-Slide, 48	.0004" to .0252"	.0006" to .0309"	.0006" to .0312"
Spindle Speeds, 12	41 to 1270	50 to 1357	16 to 880

DELIVERIES

Prompt delivery direct from factory.

PRICES

Turret Lathe prices are substantially lower than before the war.

TIME PAYMENTS

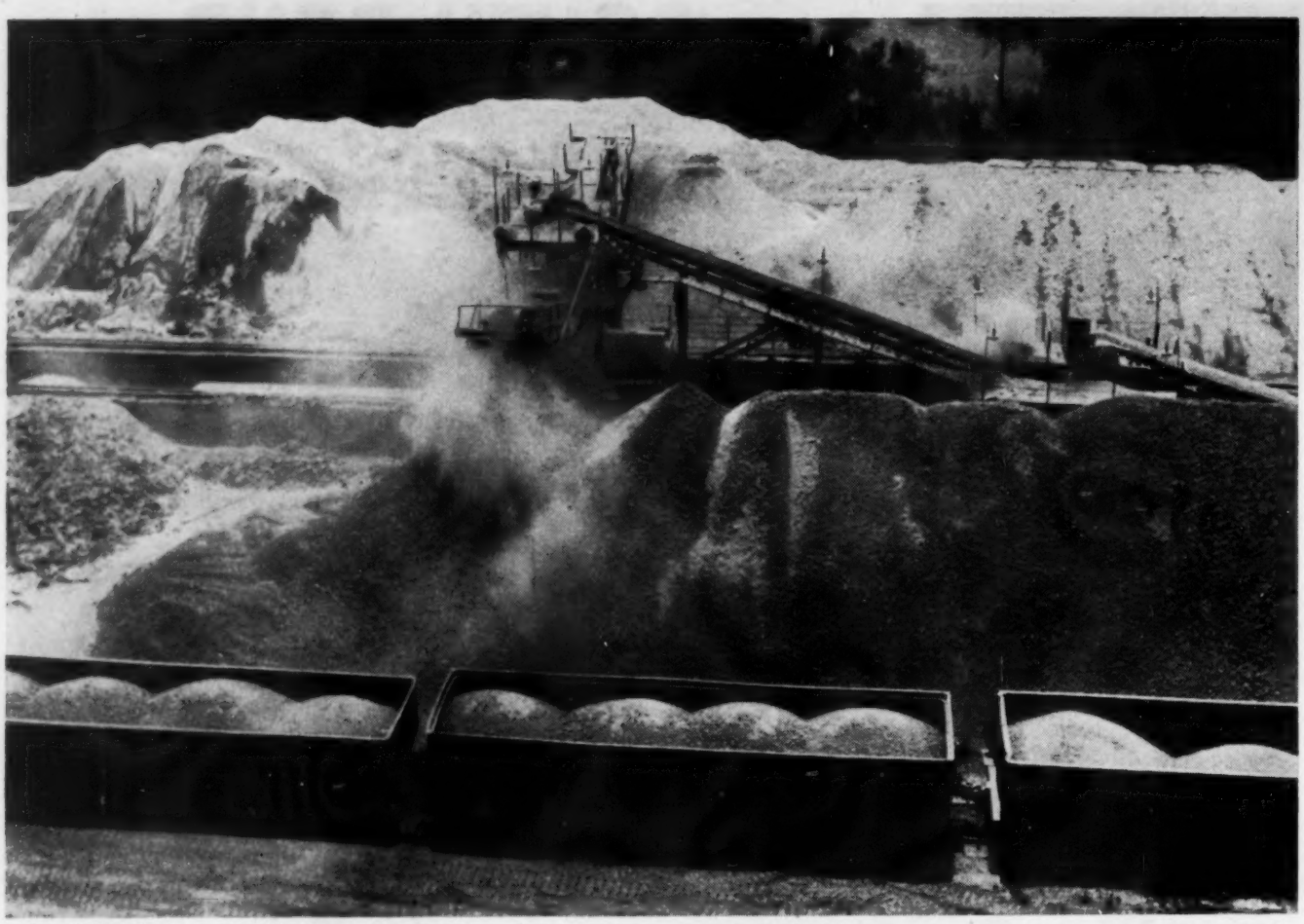
25 per cent down, and 12 monthly payments. Moderate finance charge.

Series 1000 Turret Lathe
—prices start at
$1147.00
f. o. b. factory, less electrical equipment.

BUILDING BETTER LATHES SINCE 1906

SOUTH BEND LATHE WORKS

429 EAST MADISON STREET • • SOUTH BEND 22, INDIANA



1. Bauxite from South American deposits is unloaded and stockpiled at the Baton Rouge plant of The Permanente Metals Corporation, where it is converted to *alumina*. The plant, located on the Mississippi River, comprises 34 buildings on a 318-acre river site, is capable of turning out one billion pounds of alumina per year. It requires four pounds of bauxite ore to make two pounds of alumina.

KAISER ALUMINUM

FROM ALUMINA TO FINISHED ROLLING, PERMANENTE METALS CONTROLS EVERY STEP IN THE PRODUCTION OF KAISER ALUMINUM, ASSURING QUALITY PIG, INGOT, PLATE, SHEET, STRIP, AND ROOFING.

It's something of an achievement to turn out, in a single year, almost as much aluminum as the entire industry produced in the most productive year before the war.

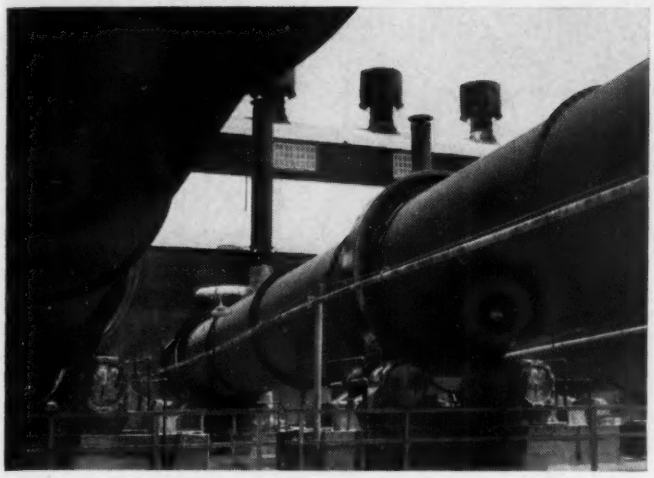
It's even more of an achievement to gain a reputation for quality and service at the same time. One reason The Permanente Metals Corporation has gained this reputation is its integrated operation—from alumina to the finished product.

The story here takes you from the delivery of bauxite at Baton Rouge to the rolling of finished aluminum at Permanente Metals' Spokane mill, with capacity of 288 million pounds yearly.

But no pictures and text can convey to you the eagerness of this young-minded organization to serve the buyers of aluminum . . . to tackle the toughest problems . . . to take its place as a vital factor in this age of light metals.

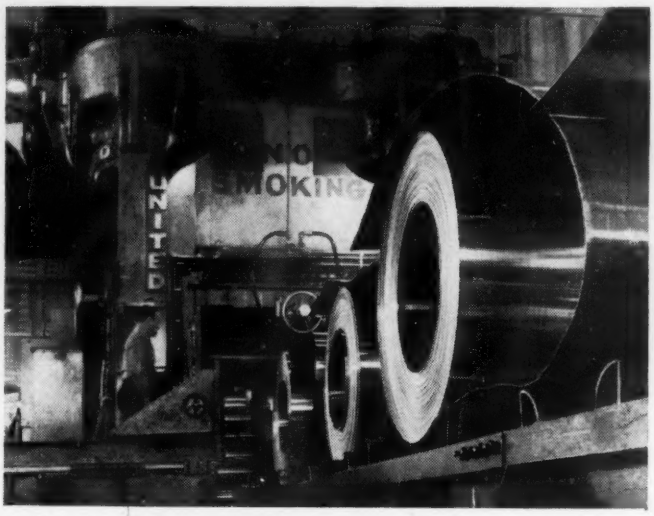
Kaiser Aluminum is a product second to none—not merely as a *substitute* for other metals and materials, but as their *successor* in the scores of applications where aluminum can add something new: lightness, strength, workability, resistance to corrosion, beauty.

And this aluminum is here *today*—ready to meet your requirements!



2. It isn't alumina yet—but this view in the Baton Rouge plant shows the final step in processing. These giant rotary kilns operate at 1800 degrees F., and cook the alumina hydrate into snow-white alumina powder. This alumina is then loaded into box cars and goes by rail to Permanente Metals' reduction plants at Spokane and Tacoma, Washington, where it is converted into basic aluminum.

3. Spokane, Washington, is the home of the reduction plant of The Permanente Metals Corporation, where alumina is made into basic aluminum. Another reduction plant, at Tacoma, increases the supply needed to keep the Spokane rolling mill operating at capacity. Reduction process requires tremendous power. Metal is cast into pure aluminum pigs, then sent to rolling mills for remelting and alloying.



4. The rolling mill at Spokane is capable of producing more than 288 million pounds of aluminum yearly. Two-ton ingots of alloyed aluminum are hot-rolled into long strips. Cut into sheets, the metal is cold-rolled to proper specifications (above). Careful handling and constant testing assure outstanding quality. This plant comprises 53 acres. Plate, sheet and strip are loaded directly into cars for shipping.

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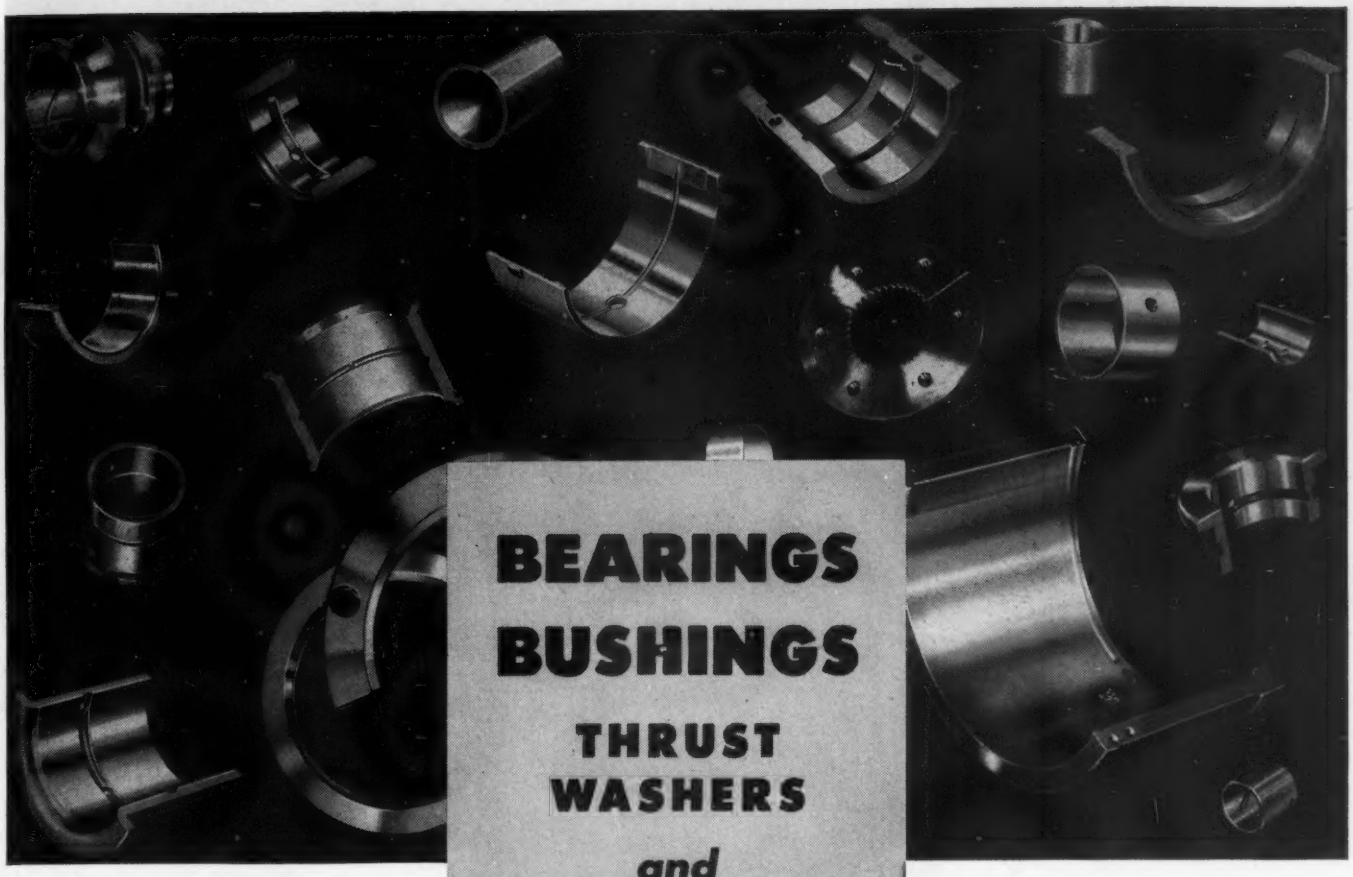

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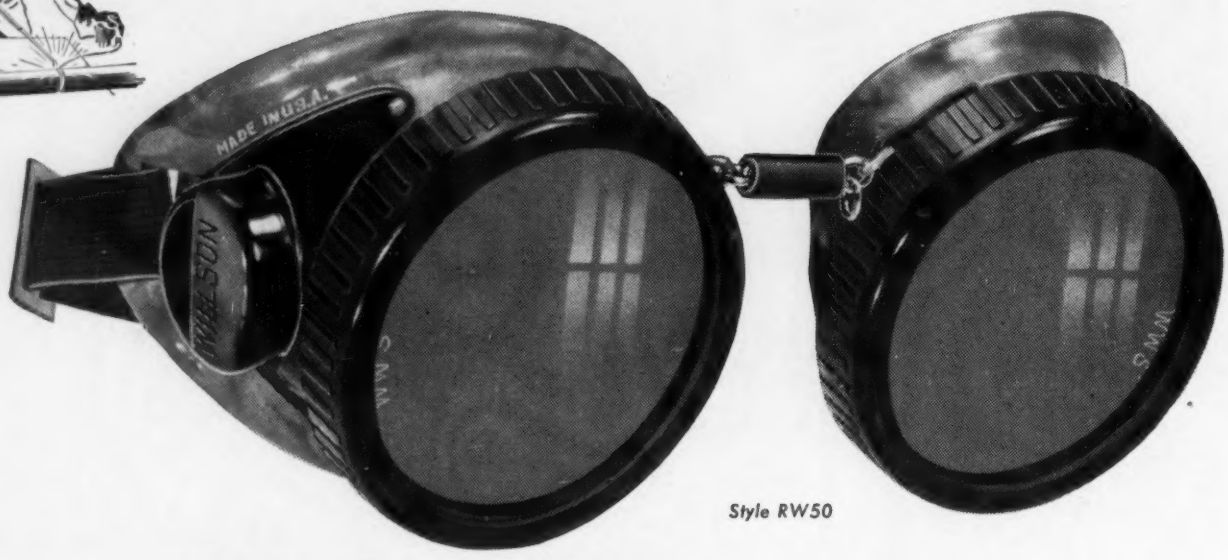

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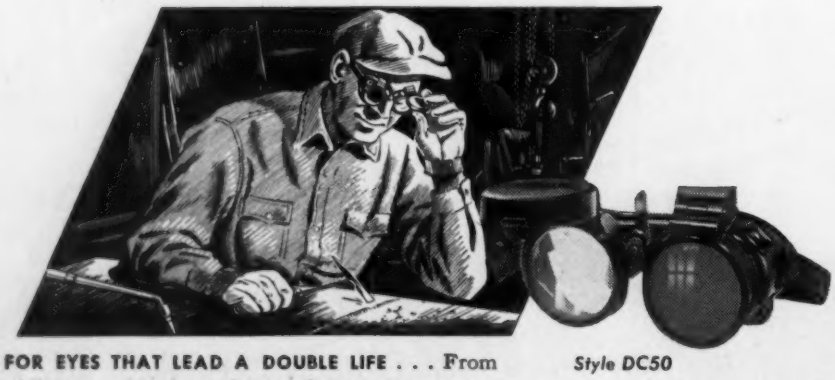

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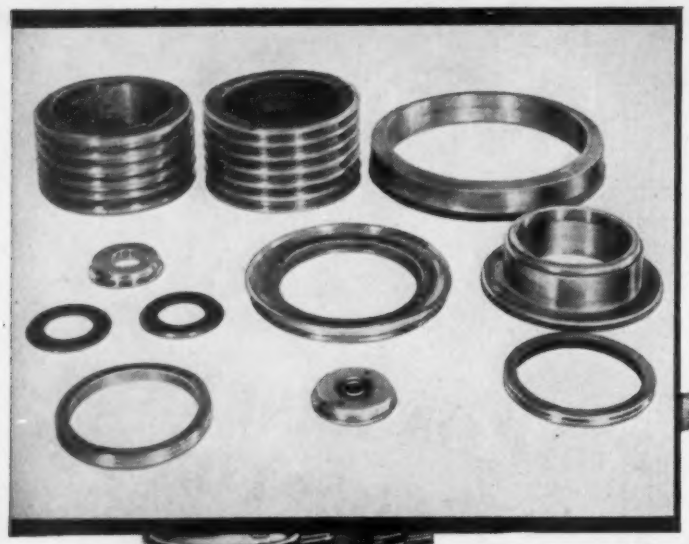

Of these eleven tools, used in the manufacture of drums, nine are hard-faced with HAYNES STELLITE rod. The two small wheels are solid HAYNES STELLITE alloy.

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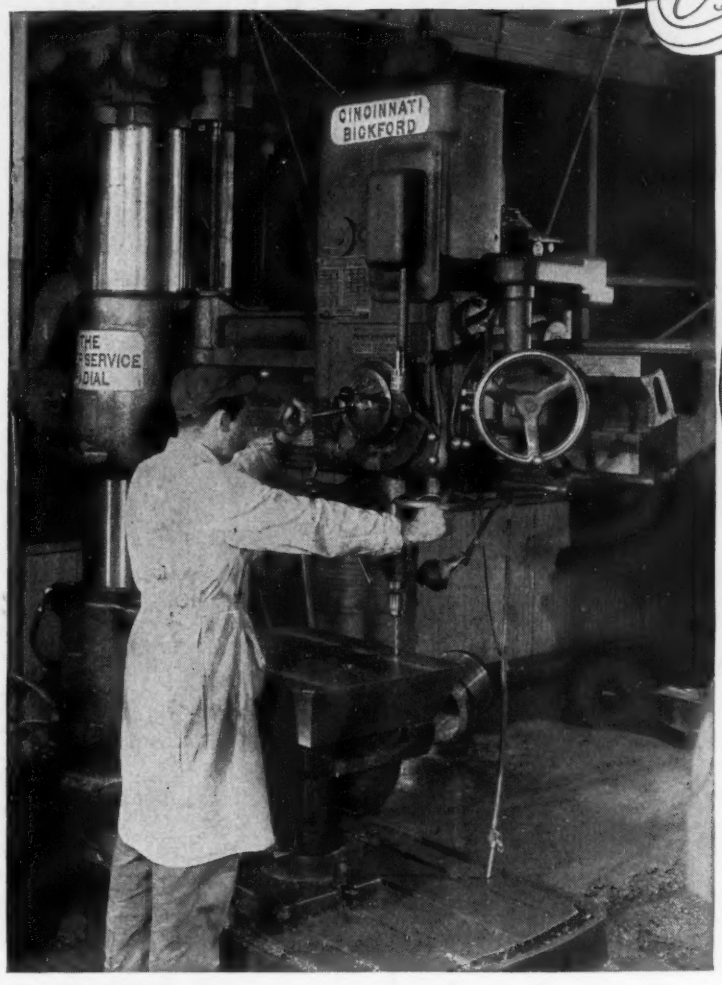
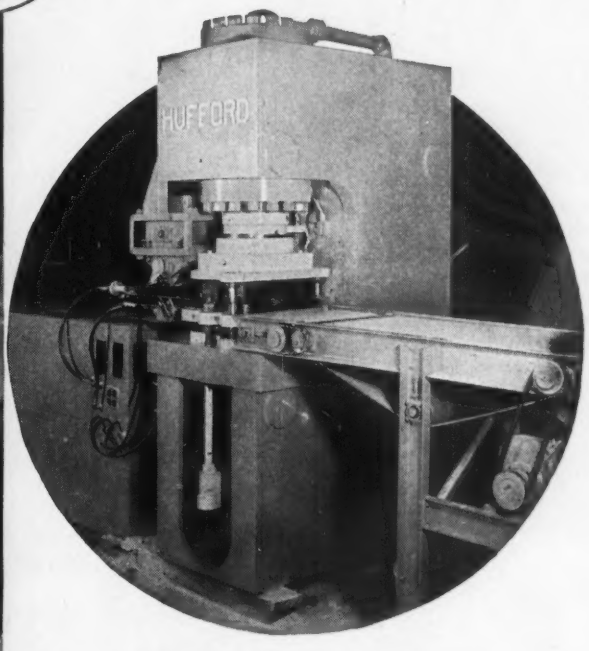


Illustrations . . .
Courtesy Hufford Machine Works, Inc.



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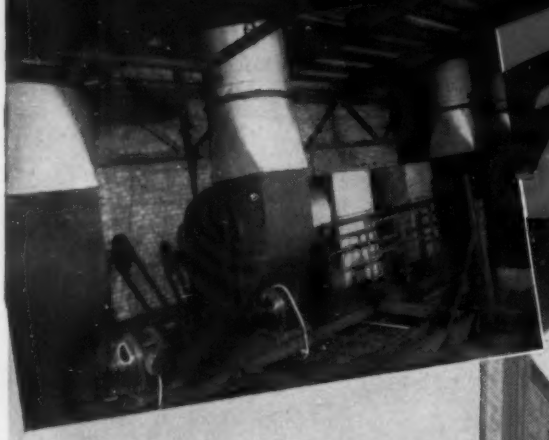
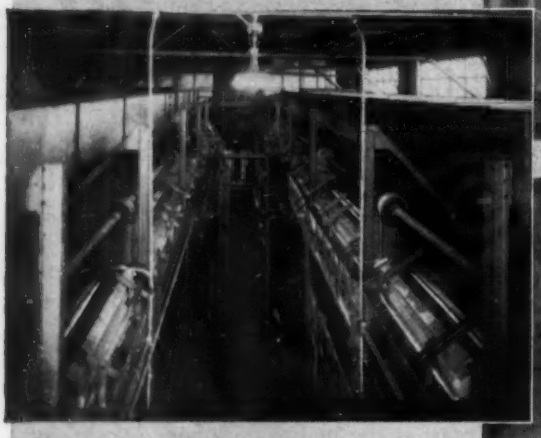


At Right: Interior of Mahon Combination Spray Booth-Dryer Designed to Handle Railroad Coaches and Locomotives. Note Electrically Operated Scaffold-Elevators on Either Side (these may be adjusted up or down by the workmen at will from any position on the scaffold). Note, also, the Filtered Air Diffusers in the Upper Foreground. Above: The Suction-Exhaust Fans Located Directly Above the Hydro-Filter Units in the Rear of the Combination Spray Booth-Dryer.



Top View Showing the Two Combination Spray Booth-Dryers with Heating Ducts, Filtered Air Supply Units, and Operating Mechanism for Scaffold-Elevators.

Mahon Hydro-Filter Units on Either Side at Rear End of Combination Spray Booth-Dryers. These Remove Overspray from the Air Before it Enters Exhaust Fans.

Box Cars, Coaches, Buses and Trailers

Here is a typical Mahon Finishing System designed to meet railroad requirements in shops where repainting of rolling stock constitutes a major operation. This system consists of two combination Spray Booth-Dryers (one is illustrated above), and a Filtered Air Supply Unit. The two Spray Booth-Dryers are installed on parallel, adjacent tracks inside the shops, and may be operated simultaneously or individually as desired. This installation is another excellent example of the thoroughness of Mahon planning and engineering to meet specific requirements under any conditions. Twenty-seven years of pioneering and constant research in this highly specialized field have endowed Mahon engineers with a wealth of technical knowledge and practical know-how not available to you elsewhere. See Mahon Insert in Sweet's Mechanical Industries File.

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STEEL

The Magazine of Metalworking and Metalproducing

VOL. 121, NO. 7 AUGUST 18, 1947

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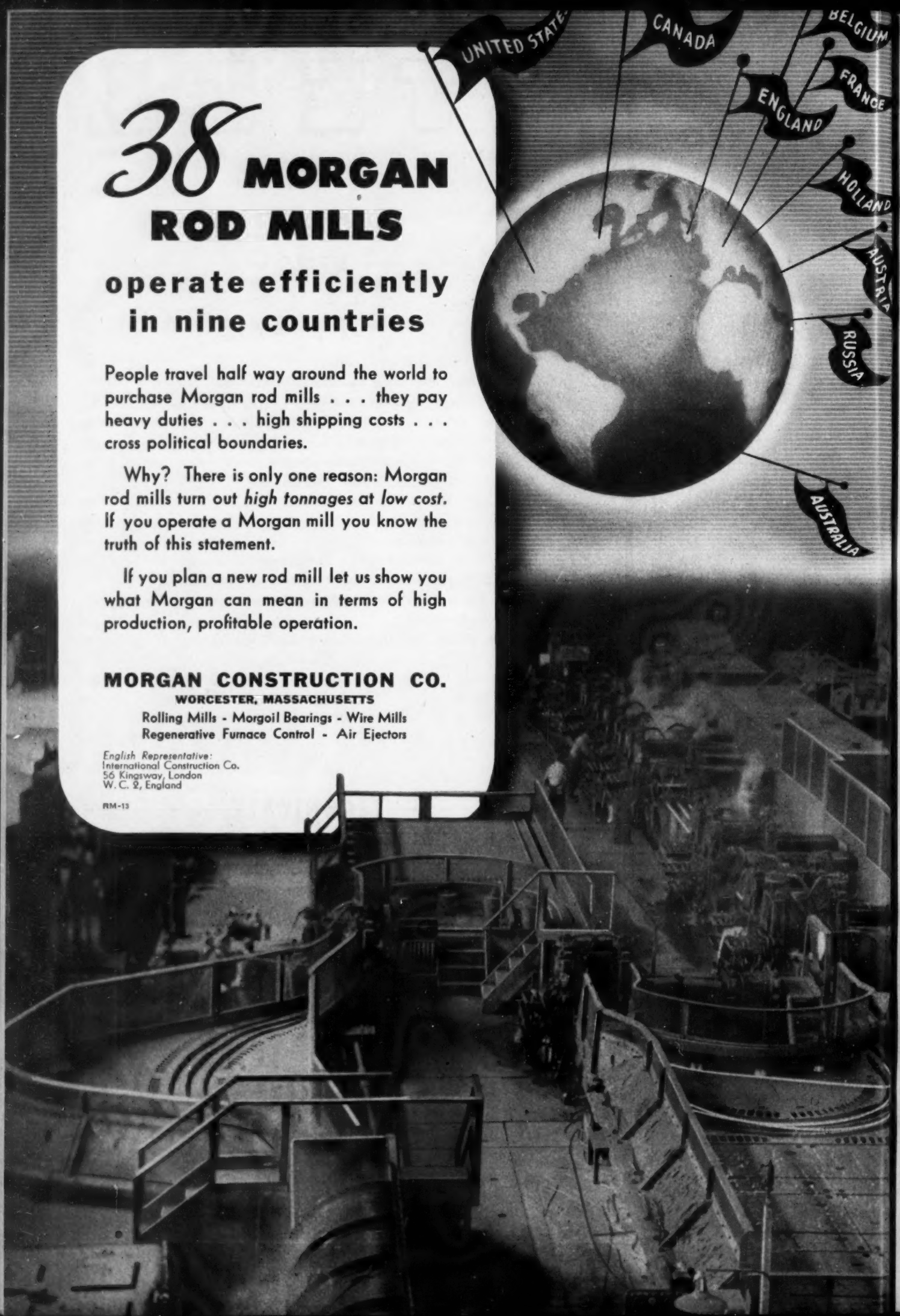

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RM-13

August 18, 1947

De-Emphasizing Size

Since V-J Day two years ago, more has been said and written about small business and its problems than at any previous time in our history. Unfortunately, much of the discussion of the subject is in such general terms that it is difficult to determine the relative importance of the small business problem in any given industry or branch of industry.

For this reason it may be well to look at small business from the standpoint of the iron, steel and metalworking industries. To what extent are the problems of small business of pertinent concern to conscientious executives in these industries?

Part of the answer lies in the definition of what constitutes "small" business. In its recent report entitled, "Meeting the Special Problems of Small Business," the Committee for Economic Development listed four tests for smallness. It stated that usually a small business manifests two or more of these characteristics:

1. Management is independent; usually managers are also owners. 2. Capital is supplied and ownership held by an individual or small group. 3. Area of operations is mainly local, although markets need not be local. 4. The business is small when compared to the biggest units in its field.

With these tests in mind, consider that the most recent census figures show that of the 3,317,000 business units in this country in 1939, 1,503,000 had no employees, 1,221,000 had from 1 to 3 employees, 305,000 had from 4 to 7, 166,000 had from 8 to 19, 70,000 had from 20 to 49, and 52,000 had 50 or more employees.

It is obvious from this breakdown that a large proportion of what is generally considered small business consists of retail stores, sales and service companies, and other non-manufacturing units. Probably most of small business in the metalworking field is included in the 122,000 companies employing 20 or more employees.

Here smallness is relative, and if one were to delve deeply into the character of companies having "small business" problems in the metalworking industries, he would find that those whose problems are most acute are companies which could be classified more accurately as being of intermediate size. During the past decade it has been the acquisition of companies of this size by larger competitors that has caused most of the furore about small business in industry.

For this and other reasons, it would be wise—in studying the metalworking industries—to de-emphasize size and to concentrate on efforts to insure fair opportunities for all business—regardless of size.

* * *

UNION RESPONSIBILITY: Reaction of a union to the penalty clauses of the Taft-Hartley Act is a good index of the quality of leadership and discipline of that union.

International Ladies Garment Workers Union—a strong, ably administered AFL organization—has announced it will sign no-strike contracts where it has union shop agreements and will punish union violators. National officers of the Operative Plasterers & Cement Finishers International Association, while not favoring the Taft-Hartley Act, have ordered locals to comply with it "in every respect."

One reason for the flare-up between United Automobile Workers and Ford Motor is that UAW is one of the poorest disciplined outfits in unionism. UAW leaders are virtually powerless to prevent unauthorized strikes. Strict application of the Taft-Hartley penalties would bankrupt the union treasury in no time.

Therefore, the union was granted a year of grace to get its house in order. Meanwhile UAW-CIO is committed to renew its efforts to stamp out unauthorized work stoppages and Ford is given tacit union approval to discipline the fomenters of wild-

(OVER)

AS THE EDITOR VIEWS THE NEWS

cat strikes. Beyond these measures is provision for a four-man committee to work out a solution to the question of the union's liability for damages for breach of contract.

All of this constitutes progress toward greater union responsibility—a primary objective of the new labor law. —p. 73

• • •

OUR NARROW ESCAPE: House Small Business Committee's Government in Business Subcommittee will conduct hearings this fall to consider the complaints of businessmen against the competition of government-owned corporations. The subcommittee wants to find out the extent to which these government businesses encroach upon the field of private business. The hearings will bring out testimony on the encroachments of such organizations as Defense Homes Corp., Inland Waterways Corp., Tennessee Valley Authority, Rubber Development Corp., Warrior River Terminal Co., Export-Import Bank of Washington and many others, whose total assets as of July 1, 1947, were estimated at between $15 and $16 billion.

If these hearings are conducted intelligently, and if they are broadened to include the encroachments upon private business of certain activities of executive departments of the government, the results should be illuminating. They will show how dangerously close the New Deal came to plunging the nation into a state capitalism or socialism such as that which now plagues Britain. —p. 66

• • •

THE BREAK IN SCRAP: Throughout a large sector of the metalworking industry the question arises as to whether the break in scrap prices last week was a flash in the pan or the first of a series of corrective price movements in that important commodity.

It is obvious to everybody that heavy melting steel at $42 and pig iron at $37 represents a curious market situation. Such a violent distortion of the normal relationship between the prices of these materials could exist only under most unusual conditions of supply and demand. With steelmaking facilities working steadily at 95 per cent of capacity and with scrap supplies limited, fantastically high scrap prices were to be expected. At the same time, melting steel at $42 and higher, in itself is provocative of efforts in many directions which eventually will force a reduction in price.

Scrap markets are sensitive to such forces, and it may be that last week's break is a forerunner of other corrective movements to come. —p. 143

SIGNS OF THE TIMES: An item in the War Department's appropriation for the fiscal year 1948 will encourage the collection and sale of scrap. The department now has a special fund of $25 million for preparing, bundling, shipping and advertising scrap (p. 66) and it should bring out a greater volume of ferrous and nonferrous material . . . . Principal conclusion in the second semiannual report of the Atomic Energy Commission to Congress (p. 69) is that more talented individuals and more well managed private industries now otherwise engaged must actively participate in the atomic energy program if this nation's pre-eminence in this field is to be maintained and increased . . . Additional details regarding the Ford Motor pension plan (p. 73) indicate that under certain conditions veteran employees can retire with annual incomes amounting to about 60 per cent of their base pay. Protests against the retirement plan seem to be confined to the communist contingent . . . . Reduction of exports from the United States in June, as compared with peak exports in May (p. 78), is attributed to limitations imposed by numerous foreign nations upon the purchase of American commodities to conserve dollar balances. This is a development well worth watching, because a sharp curtailment in exports would have important repercussions upon the balance of supply and demand and upon prices in domestic markets . . . . A visit to the automobile body plant of Nash-Kelvinator Corp. in Milwaukee makes one aware of the versatility of compressed air tools. Compressed air is used for the cushions and control systems of most of the 150 forming presses, for the elaborate paint spraying installations (p. 89), and for pneumatic grinders, screw drivers, drills, wrenches, and numerous special assembly devices . . . . Vote to defer nationalization of Britain's iron and steel industry for the duration of the present crisis (p. 70) has interesting implications. By withholding votes that could have authorized nationalization, the labor party in effect admitted that nationalization is not the exclusive remedy for Britain's dilemma . . . . "Honing and Lapping" is the subject of the final installment of Guy Hubbard's series of articles (p. 86) on modern machine tool equipment and practice . . . 100 plants making coin operated devices this year will produce machines valued at $150 million (p. 57) and will consume 280,000 tons of steel, 32,000 tons of copper, 4300 tons of zinc, 3000 tons of aluminum and 4500 tons of gray iron castings.

E. L. Shaner

EDITOR-IN-CHIEF

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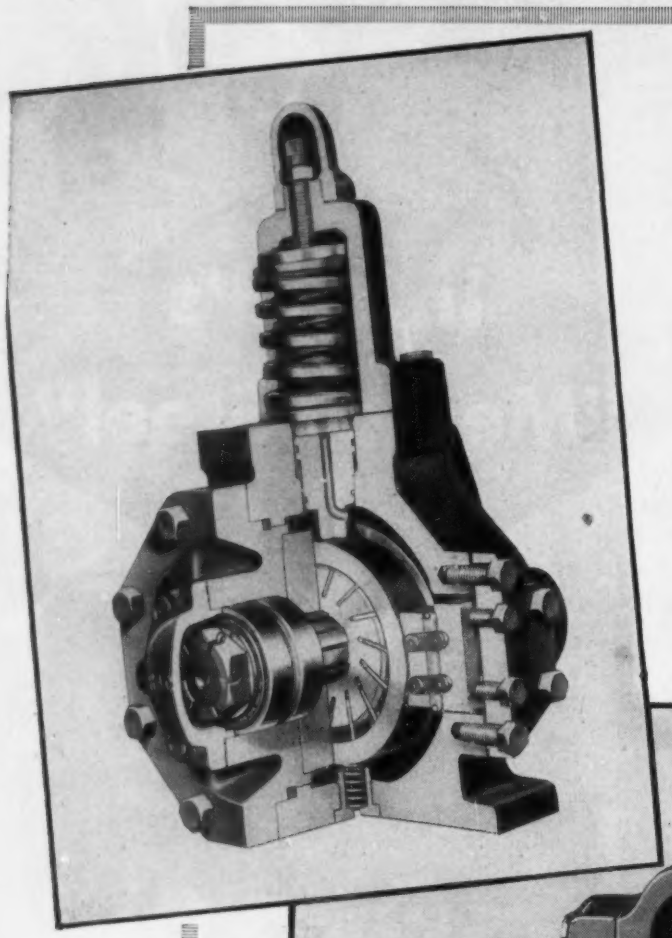
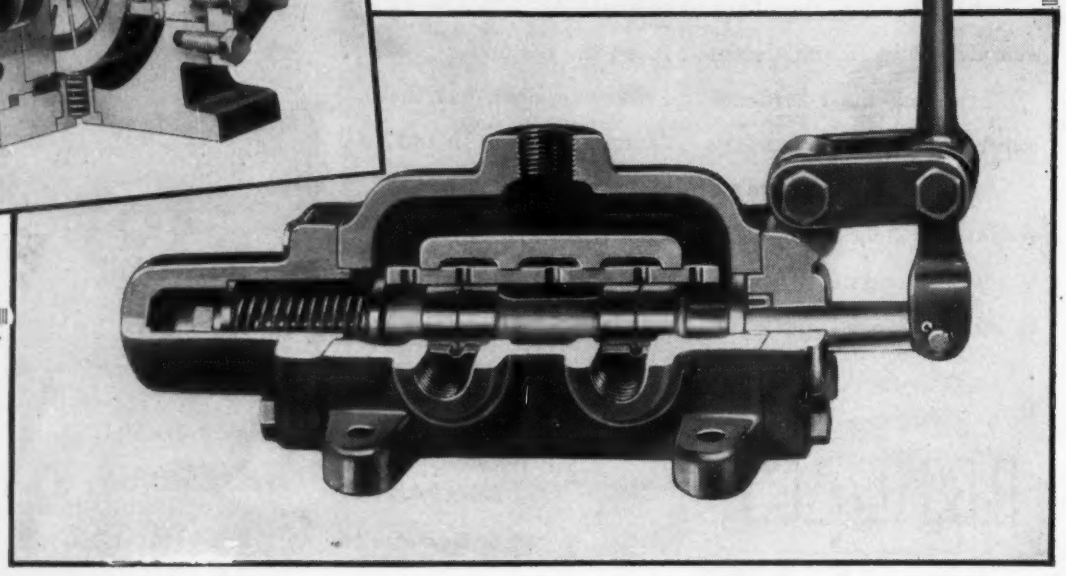


Keep Hydraulic Systems Free From RUST and SLUDGE



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Tune in . . . TEXACO STAR THEATRE presents the TONY MARTIN SHOW every Sunday night. See newspaper for time and station.

Mechanisms of slot machines are intricate and sturdy, require first quality materials and workmanship. Shown is assembly line view at Mills Industries Inc., Chicago

Coin Machine Industry Sees $150 Million Year

Manufacturers of vending, amusement and music devices attempting to meet greatly expanded postwar demand, but are handicapped by materials shortages. Industry optimistic for long-term future. Expect mechanized sales to reach $3 billion annually

PUTTING a coin in a slot and pulling a lever has become an accepted way to purchase cigarets, candy bars, chewing gum and soft drinks for millions of Americans. Juke boxes supply music in thousands of cafes. Coin-operated devices supply amusement in a wide variety of ways.

Sales of candy, cigarets, gum and beverages through coin vending machines last year amounted to $500 million, according to United States Department of Commerce estimates. Within the next ten years, the total of mechanized sales may amount to $3 billion, the department says. The variety of goods sold through coin vending machines is expected to be widened to include most everything from frozen foods to garden seeds, and from gasoline to insurance policies.

This outlook means a rapid expansion for the manufacturers of coin machines, at present by no means an inconsequential segment of the metalworking industry.

The 100 factories making coin-operated devices this year will produce a volume estimated at $150 million, wholesale value. Fifteen hundred plants will supply materials, parts and components.

They will consume about 190,000 tons of cold-rolled steel, 50,000 tons of cast steel, more than 40,000 tons of stainless steel, 32,000 tons of copper, 4300 tons of zinc, nearly 3000 tons of aluminum, 4500 tons of gray iron, more than 40,000 tons of brass and large quantities of glass, plastics and rubber.

And if steel and other metals were more freely available, they would produce 40 to 50 per cent more. The industry is far behind in supplying the demand for its machines and the shortage of materials is delaying the production of some of the newer machines in favor of the old favorites.

Coin machines generally are divided into three major classifications: Vending and service machines; phonographs or juke boxes, of which 400,000 are in operation; and amusement devices, which include some 2500 separate games, slot machines and other evolutions of the old penny arcade attractions. Most of these machines are sold by the manufacturer to operators, who stock and service the machines and split the proceeds with the owner of the location.

By W. J. CAMPBELL
Associate Editor, STEEL

Other types of coin-operated machines which are an important factor in the business but which the industry is uncertain as to how to classify are parking meters, usually purchased outright by municipalities, baggage lockers for railway and bus terminals, which usually are owned by the terminal, postage meters, coin-operated gas meters, and similar devices.

The first coin-operated machine recorded by history was invented in Egypt about 100 B. C. by Hero Alexandria who made a device which dispensed holy water upon insertion of 7 drachmas.

The modern coin machines got their start in this country in the 1890s in supplying devices for the penny arcade. The infant industry continued in its swaddling clothes until the depression hit in the early 1930s. Coin machines caught the fancy of the public during this period and slot machines, pin ball games, cigaret and candy vendors and

juke boxes blossomed forth in almost every section of the country.

Popularity of the cigaret vendor with proprietors of restaurants and stores was due to a combination of labor saving and to the fact that it lessened theft of cigarets by employees.

The growth in popularity of the coin machines can be measured roughly by the tremendous increase in demand for coins. In 1932 the Philadelphia mint turned out 14.5 million pieces; in 1933, 14.4 million. By 1943 when the coin machine industry really got going the mint turned out 303.4 million pieces.

Pin ball and slot machines which paid off in cash when a "jackpot" combination was hit became extremely popular in the thirties, but were outlawed by anti-gambling laws and ordinances in some states and subdivisions. Cash-paying pin ball machines in large measure have given way to devices "for amusement only."

Mechanical phonographs were given a filip by the repeal of prohibition, and few cafes are complete without a juke box. Such purveyors of food and drink also are favorite locations for miniature movies, pin ball devices and vending machines.

Vending machines grew steadily in favor. Manufacturers' designers and engineers steadily improved the machines to minimize the service calls necessary and the loss of time due to "out of order" machines. Before the war, the cigaret, candy, gum and soft drink machines carried the bulk of mechanized sales, although others were appearing.

Early in the war, materials conservation orders ended the manufacture of most coin machines and the industry converted to war, with many manufacturers winning the Army-Navy E pennant for war production. With the relaxation of the conservation orders, the industry swung back to the production of their old lines, with many new products added.

Two years after V-J Day, the industry is in large-scale production and is turning out a record-breaking number of machines. If materials were freer and sufficient skilled labor, designers and engineers were available, output would be even higher.

Design is particularly important in coin machines. Manufacturers and operators have learned the visual appeal of the device often means the difference between a "hot" number and a "dead" one. If any coin machine fails to get a good play, the operators quickly cross it off their lists and the manufacturer may never recover his development and tooling costs, which may run into several hundred thousand dollars for a complicated machine. Manufacturers have five failures or mediocrities for every winner.

For this reason, coin machine manufacturers have bought the services of some of the top designers in the country, including Raymond Loewy, Walter Teague, Everett Eckland, Norman Bel Geddes, Henry Dreyfuss, John Vassos and dozens of others.

Engineering of the intricate mechanisms (a pin ball machine may have 1400 parts) is equally important. A machine to be profitable must be in working order most of the time and service calls must be kept to a minimum. Coin machines are subjected to much abuse. They are jarred and pounded by the customers. They are attacked by screwdrivers and burglars' tools—by otherwise honest citizens who take the attitude that any means to beat a coin machine is fair.

This requires that materials and workmanship be of the highest possible quality.

The nature of the machines themselves offers some knotty engineering problems. Two of these which only recently have been solved are the development of slug rejectors and of change makers.

The need for the latter is obvious. If a vending machine is to do its maximum volume of business, provision must be made to provide change. This resulted in the development of change makers which are located adjacent to vending machines. Today, many manufacturers are building change makers into their vending machines and the customer may insert a quarter in a beverage machine, receive a coke and his change in nickels and dimes. Further progress in the development of these change makers is being made in coin machine engineering departments today.

One of the early curses of coin machines was that they would work just about as well with slugs as with coins. The operators' take in the old days was considerably watered with worthless slugs. This not only annoyed the operators but the Federal Bureau of Investigation as well. The manufacturers volunteered their co-operation, and came up with an intricate magnetic slug rejector which is 99 per cent effective. These are attached to all types of coin operated equipment after being tested with slugs of all known combinations of alloys. Thus equipped with a mechanical set of morals, they virtuously reject any but United States minted coins.

Capital of the coin machine industry is Chicago, although such devices are

Extreme left, one of the newer coin-operated devices shines shoes. A nickel must be inserted for each shoe; one side is for black and the other is for brown. This machine is manufactured by Coin-Arts Industries, Milwaukee

Fruit juice vending machine, at left, a favorite among coin machine manufacturers, uses substantial quantities of cold-rolled steel. NEA photo

manufactured in most states. Chicago manufacturers are estimated to make 65 per cent of the music boxes, 85 per cent of the amusement machines and 47 per cent of the vending and service machines, according to a recent survey by Commonwealth Edison Co. Recently several large corporations making varied lines of electrical and other metalworking equipment have entered the field. Westinghouse Electric Corp. recently developed a beverage mixer, complete with coin changer and including a germicidal lamp to insure sanitation, for the Coca Cola Co. Bath Iron Works, noted for building submarines, has introduced a new giant in vending machines, offering 10 different bottled soft drinks and 11 varieties of cheese, nuts, cookies, gum and candy.

One of the best known names in coin machine manufacturing is that of Mills Industries Inc., Chicago. This company devotes nearly 600,000 sq ft of manufacturing space to the design and production of vending machines, phonographs and amusement devices. Mills Industries uses substantial tonnages of metals, including steel, principally cold-rolled sheet, some galvanized sheet and small angles, brass screw machine stock and strip, and aluminum. Some of these materials are purchased in mill quantities; others are obtained from warehouses.

Within its own shops are performed many metalworking operations, including machining, stamping, gear cutting, toolmaking, die making, forming, finishing and plating.

Subcontracts Are Limited

The company subcontracts little work, although components, such as electric motors and die castings, are purchased from other manufacturers. Recently the company has been substituting aluminum for steel in phonograph cabinets and has subcontracted the forming of these.

The company's No. 1 problem at present is that of practically all other metalworking companies—the obtaining of an adequate supply of metallic materials at a reasonable price. The scarcity of steel currently is pinching most severely and spokesmen say that if steel were available in the sizes and specifications needed at quoted prices, costs could be reduced by 50 per cent.

The shortage being what it is, Mills has been forced to accept substitutes, and to buy surplus war material.

Stainless steel, of which the company uses large quantities, must be polished on both sides, requiring a fairly stiff extra charge. Ninety-five per cent of the steel sheet used is cold-rolled. Most brass used is half hard.

While materials are the greatest obstacle to increased production, skilled manpower procurement also is difficult.

Equipment procurement no longer offers any great difficulties, although many of these items were difficult to obtain in the early months of reconversion.

Were it not for the shortages of materials and skilled manpower, Mills Industries today would be producing coin machines at a rate of 40 to 50 per cent above the present production, and at considerably lower cost.

For the future, Mills officials expect the greatest expansion to come in vending machines, although music and amusement items will continue to bulk large.

Investigate Overbillings in Wartime Steel Shipments

Two Maritime Commission investigators were in Pittsburgh last week holding meetings with steel producers with a view to obtaining adjustments in billings for wartime steel supplies. Producers in other districts will be contacted over coming weeks.

The current conferences are more or less preliminary to a detailed exploration of the commission's claims of overbilling and may take months to complete. Nub of the situation is that the commission charges the steel companies shipped to its account more steel than it had actually ordered. This, it is said, was caused by the shipment of excessive weights and sizes not specified.

Expectations are the steel companies will willingly make adjustments where it is actually developed that such excessive shipments were made.

Steel Producers Report Big Increase in Wage Bill

Wage and salary bill of the iron and steel industry in the first half of 1947 totaled $958,573,000, almost as large as the payroll of $960,779,000 in the entire year 1940, the American Iron & Steel Institute reports. In the 1946 first half, which was affected by strikes, the total of wages and salaries was only $690 million.

The June wage bill was estimated at $167,625,000, approximately the same as in April but below the May total of $175,793,000. Average hourly rate of pay for hourly, piecework and tonnage employees in June was $1.547, compared with $1.556 in May.

Present, Past and Pending

■ UNCOMPLETED BLAST FURNACE SOLD BY WAA

WASHINGTON—The uncompleted blast furnace at Rusk, Tex., has been sold by the War Assets Administration for $300,000 to McCrossin & Co. of Texas. The purchaser is to complete the wartime facility, the expense estimated at $150,000 or more.

■ SHEET SHORTAGE PROMPTS USE OF SUBSTITUTE

DETROIT—Hudson Motor Car Co. has been substituting high-tensile, low-alloy steel for a number of body parts because of the shortage of regular carbon steel sheets. Although more costly than ordinary carbon steel, the substitute can be used in lighter gauge.

■ TRACTOR SEAT MAKER REDUCES PRICE

MONROE, MICH.—Price reduction of approximately 20 per cent on its postwar-developed tractor seat has been announced by Monroe Auto Equipment Co. The reduction is attributed to low-cost volume production.

■ NEW ALUMINUM UTILITY SHEET DEVELOPED

OAKLAND, CALIF.—Development of a new aluminum utility sheet to replace steel for many uses has been announced by Henry J. Kaiser Co. It was perfected at the Spokane rolling mills of Permanente Metals Corp.

■ UTAH BLAST FURNACE OFFERED FOR SALE

SALT LAKE CITY, UTAH—Sealed bids will be received until Sept. 10 by the War Assets Administration here on an Ironton, Utah, blast furnace operated during the war by Columbia Steel Co.

■ SALE OF PHOENIX IRON CO. TO BE CONSIDERED

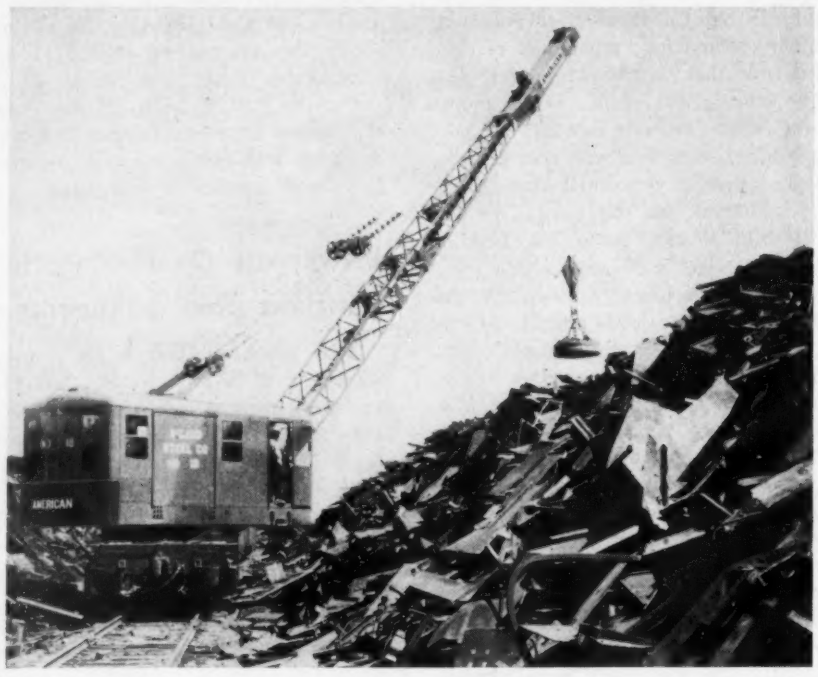
PHOENIXVILLE, PA.—Stockholders of Phoenix Iron Co. were being notified last week to attend a meeting Aug. 21 to consider a proposal for purchase of their company by a firm reported to be a western Pennsylvania interest.

WIREMOLD GUARANTEES PRICES FOR REST OF 1947

HARTFORD, CONN.—Wiremold Co. is guaranteeing for the rest of 1947 its prices on raceways, fittings and fluorescent lighting equipment as published Feb. 1, 1947, D. Hayes Murphy, president, announced.

Steel Price Pattern Being Clarified

Newly effected schedules taking hold but further adjustments are expected. Changes in extra cards raise delivered prices on some flat-rolled specifications



DIESEL-ELECTRIC CRANE: American Hoist & Derrick Co., St. Paul, has introduced a new diesel-electric locomotive crane. Electric power is used to travel the crane along rails while diesel power operates the turntable and load-lifting mechanism. Shown here is one of the units handling scrap at Inland Steel Co. yard

WHILE the steel market appears firmly established on the higher price level, recently effected, expectations are considerable confusion will continue to be encountered in applying the new schedules pending complete clarification of the situation.

New prices remain to be named on a few fairly important products, while some of the smaller producing interests have not yet publicly announced their price policies. It is generally expected, however, that these latter companies, for the most part, are going along on the upward revisions with the larger producers.

Here and there some departures from the general market pattern are being encountered. An outstanding instance of this is the case of Carnegie-Illinois Steel Corp., subsidiary of U. S. Steel Corp., in naming lower prices on certain products than did leading independent producing interests.

This dual price structure on these specific items is bound to cause some confusion in the market. Whether the two sets of prices will continue long is uncertain. Market opinion on the subject is mixed, some observers being of the view the Carnegie prices will be generally accepted as the market, while others express the thought that so long as demand continues as insistent as at present the independents will continue to quote the higher prices.

Other Departures from Pattern

Some other departures from the general market pattern are also being encountered among the smaller producers, especially in those instances where special circumstances surround individual company customer relations and where competitive conditions dictate conservative action.

In addition to announcement of new prices on a few remaining products, expectations are additional changes in extra cards can be expected over coming weeks. As a matter of fact, a few changes in extras were made at the time the new base price schedules were published.

In this connection an important change in quantity extras on hot-rolled carbon bars was effected by two units of the United States Steel Corp., the Tennessee Coal, Iron & Railroad Co., Birmingham, and the Columbia Steel Co., San Francisco. In the case of both companies quantity extras on bars were revised upward to the same basis as had previously prevailed in the schedule of Carnegie-Illinois Steel Corp. The new schedule raised the base quantity from 5 to 20 tons and in effect means that on small lots in the areas served by the two companies the increase in price on bars is more than that effected by Carnegie in its normal marketing territory since the latter's quantity extra schedule held unchanged. Considerable significance attaches to the change as it is seen diverting small-lot business from direct mill shipment to warehouse channels. As some warehouse distributors describe the situation, the South and West are back in the Union as far as small-lot carbon bar business is concerned. The list of quantity extras on bars now made uniform is as follows; 20 tons and over, none; under 20 tons to 10 tons, inc., 5 cents; under 10 tons to 5 tons, inc., 10 cents; under 5 tons to 3 tons, inc., 15 cents; under 3 tons to 2 tons, inc., 20 cents; under 2 tons to 1 ton, inc., 35 cents; under 1 ton to ½ ton, inc., $1; under 1000 lbs., $1.50.

Several changes in extra lists also have been effected by Carnegie-Illinois Steel Corp. In the case of most of these changes they are explained as simply bringing the company's cards into line with those of other producers. The changes involve the flat-rolled products. Net effect of these extra revisions is to raise delivered prices in some instances from $3 to $5 per ton over previous lists, although some minor reductions also were made.

Affected by the extra list changes are hot-rolled annealed carbon sheets, 19 gage and lighter; hot-rolled sheets, 18 gage and heavier; galvanized flat sheets and related products, not including formed roofing and siding; cold-rolled sheets; vitrenamel sheets; long ternes; galvanized formed roofing, siding and accessories, and electrical sheets.

On hot-rolled sheets, 18 gage and heavier, a processing extra of 15 cents for extra smooth now is charged. Commercial quality hot-rolled or hot-rolled pickled sheets calling for Rockwell hardness to a lower maximum than B 75 carry heat treatment extras. Further, orders specifying Rockwell hardness to within special and definite limits can be ordered in cold-rolled sheets only.

Chemical requirement extras on hot-rolled sheets, 18 gage and heavier, have

(*Please turn to Page* 163)

Veto of Metals Subsidy Bill Brings Curtailment in Nonferrous Output

Half of zinc production has been subsidized. Price expected to rise to 12 cents, stimulating imports despite tariff. Lead and copper prices high enough to assure sustained production without premiums

PRESIDENT Truman's veto of the metals subsidy bill (H. R. 1602) last week resulted in an immediate curtailment of production at marginal mines and this is expected to spread to other marginal mines. North Butte Mining Co., Butte, Mont., is suspending operations and will retain only a minimum crew to clean out stopes and to carry out salvage operations.

O. W. Bilharz, president, Tri-State Zinc & Lead Ore Producers Association, said that operations in the Tri-State district, where 25 per cent of all domestic zinc production customarily originates, have been brought almost to a standstill and are not expected to return to more than 50 per cent of normal.

Lead and copper prices on the free market are now high enough to assure sustained production at mines where these are the principal products. Only about 5 per cent of copper production has been subsidized in recent months, compared to a peak of 34 per cent last year. Lead prices recently have exceeded the premium subsidy level so those premiums already had lapsed.

More than half of all zinc output, however, was being subsidized. Domestic production is augmented by substantial government stocks as well as by imports from Mexico, South America, Canada and Australia, lessening the threat of a serious shortage.

Harry W. Marsh, secretary, Idaho Mining Association, thinks the price of zinc may advance to 12 cents a pound which would stimulate imports over the ⅞-cent a pound tariff wall. Such a price rise also might permit a continuation of production at some marginal mines which were previously supported by subsidies as high as 5 cents a pound.

While the lack of subsidies will have little direct effect on production of copper and lead due to the present high prices for those metals, it will have an indirect effect. It was pointed out that lead and, in the western mines, copper, are almost invariably found in the same ores with zinc, and the mining of zinc constitutes an important contribution to the lead and copper supply. In the Tri-State district, 8 per cent of all the lead produced in the United States is produced as a by-product of zinc. In the Tri-State district, Mr. Bilharz said, mine production of lead will be curtailed in direct ratio to production of zinc. In western mines, production of both copper and lead generally will be curtailed along with the output of zinc.

When the premium price plan was terminated on June 30, many marginal mines suspended operations and only a few resumed operations following passage of the Allen Bill by Congress.

Mine producers have been supported in their protest of the President's action by congressional supporters of the bill, including the House Small Business Committee, who condemned the veto at this critical period in international relations. They announced plans to push new premium price legislation at the next session of Congress.

Fabricator Support for Lower Rail Rates To West Coast Expected at ICC Hearing

SAN FRANCISCO

STRONG support for reduced rail rates on steel from Geneva, Utah, to West Coast points is indicated when the Interstate Commerce Commission holds a hearing on the matter within the next 60 days.

The lower rates which were granted on Geneva Steel Co.'s products by the ICC last spring subsequently were protested by Kaiser Co., which is opposing the reduction on the basis that its Fontana plant could not compete equitably in Pacific Coast markets.

Following the protest the ICC scheduled hearings at which both sides will be heard. A preliminary meeting was held in Denver a few days ago at which ICC Chairman Clyde B. Aitchison made formal arrangements for the main hearing. At the Denver conference Mr. Aitchison ruled against a move to open an investigation of national steel freight rates. He also ruled against a request of American Rolling Mill Co. and Sheffield Steel Corp. that they be permitted to join with Kaiser Co. in fighting the Geneva reduction.

Backing for the freight rate reduction is coming from western chambers of commerce and from steel fabricators who favor the lower rates because of the resultant stimulation to western manufacturing in competition with eastern products.

Kaiser Co. last week enlisted the aid of the Los Angeles Chamber of Commerce in its fight against publication of increased rates by Pacific Coast rail lines for carrying steel products to the Northwest from southern California.

On Sept. 1 the railroads will publish rates of 8 cents per 100 lbs to Portland and 80 cents per 100 lbs to Seattle from Fontana. Objection is based on the allegation that "roads serving Pacific Coast points have published rates of 48 cents to Portland and 54 cents to Seattle from U. S. Steel Corp.'s Geneva, Utah, steel plant. The argument is advanced that rates should be on a parity.

The Fontana-Portland-Seattle Sept. 1 rate increases are the result of cancellation by the ICC of previous Pacific Coast port-to-port rates.

RFC Says "No" To Kaiser Debt Plea

Reconstruction Finance Corp. finds "no proper basis for approving the proposal" that the Kaiser Co. debt be reduced by more than $85 million.

Last week the corporation gave its decision regarding the Kaiser request that the RFC forgive $85,329,544 of the $105,452,160 still outstanding in loans made to the Fontana steel plant in California.

In a letter to Henry Kaiser, the corporation refuted Kaiser Co. claims that its profit picture made payment of the debt unfair and denied that there was any basis for the presumption that the sale of the Geneva, Utah, plant established a formula for absorption of loss by the government which should be applied to the Kaiser loan.

RFC said that "substantial reduction of the debt is asked at a time when Fontana's peacetime earning capacity has been only partially developed and despite the fact that current earnings do not reflect the substantial benefits expected from plant improvements now being made with the proceeds of an additional RFC loan of $11,500,000 in 1945. Recent income statements show Fontana profits are available for debt service and income taxes at the rate of more than $4 million per year. This figure does not reflect the substantial benefits expected to result from plant improvements now under way."

High Output Helps Metalworking Industry's Income To Edge Upward

SUSTAINED high volume of production helped the metalworking industry continue its uptrend profitwise in the second quarter of 1947.

The accompanying compilation by STEEL shows that 50 representative companies, not including steel producers, had an aggregate net profit of $55,895,660 in the second quarter, 6 per cent above the first quarter's $52,731,515. A previous compilation (STEEL, May 26, p. 67) showed that 50 representative metalworking companies' aggregate net profit in the first quarter of 1947 was 3.7 per cent above that of the fourth quarter of 1946.

Compared with the 1946 second quarter when the durable goods industries had not yet hit a rapid stride in production, the 1947 second quarter net profit of the 50 metalworking companies in the accompanying table was up 133 per cent.

Through a high volume of production the 50 companies were able to show an aggregate net profit in the first half of 1947 of $108,627,175, three and three-fourths times the $29,476,852 in the corresponding period of 1946 when large portions of the durable goods industries were severely handicapped by strikes, materials shortages and other reconversion difficulties. In the second quarter and also the first half of 1947 all these companies showed net profits. However, in the second quarter of 1946 seven companies reported a net loss, and for the first half, ten had a net loss.

The increase in net profit in the second quarter of 1947, as well as the first half of that year, would have been larger than it was had production and sales not been held back to some extent by insufficiencies of materials. Meanwhile, continued decrease in the purchasing power of the dollar canceled out some of the gain that would otherwise have accrued from the increase in dollar volume of net profits.

Another factor in holding down the gain in dollar volume of net profit was increases in deductions for wear and exhaustion of plant and equipment. This reflects recognition that unless increased amounts are set aside for plant rehabilitation and replacement there will not be sufficient funds available to meet the currently high costs of construction and new equipment.

Rising costs have prompted many industrialists to warn that the break-even point above which companies can make money is climbing ever higher, and that even a modest decline in present booming sales would have a disproportionately depressive effect on earnings.

	Second Qtr. 1947	First Qtr. 1947	Second Qtr. 1946	First Half 1947	First Half 1946
Air-Way Electric Appliance Co.	$256,197	$194,680	$35,872	$450,877	$56,085
American Brake Shoe Co.	1,057,151	1,510,444	1,016,891	2,567,595	1,346,127
American Machine & Metals Inc.	80,721	191,856	96,981	272,577	176,069
American Radiator & Standard Sanitary Corp.	3,678,788	3,478,212	1,045,397	7,157,000	1,757,652
American Stove Co.	500,256	385,334	290,037	885,590	293,628
Atlas Tack Corp.	95,658	74,199	65,717	169,857	98,566
Autocar Co.	517,767	1,326,253	303,717	1,844,020	824,876
E. W. Bliss Co.	869,660	742,209	686,996	1,611,869	460,087
Budd Co.	1,527,772	1,812,568	1,166,851*	3,340,340	2,211,425*
Caterpillar Tractor Co.	2,527,984	1,929,624	1,742,436	4,457,608	2,794,428
Chapman Valve Mfg. Co.	249,689	99,372	122,662	349,061	229,823
Chicago Railway Equipment Co.	23,126	108,158	100,175	131,284	24,199
Cleveland Graphite Bronze Co.	1,024,293	1,055,823	401,881	2,080,116	620,095
Detroit-Michigan Stove Co.	613,652	618,719	411,383	1,232,371	672,938
Diamond T Motor Car Co.	375,169	466,280	233,544*	841,449	38,255*
Doehler-Jarvis Corp.	2,095,408	2,156,906	1,094,215	4,252,314	1,614,110
Eaton Mfg. Co.	1,696,164	1,793,096	896,316	3,489,260	927,842
Electrolux Corp.	1,074,141	1,021,507	845,531	2,095,648	1,336,815
Evans Products Co.	169,403	629,956	345,556	799,359	67,952
Gabriel Co.	70,854	115,968	129,190	186,822	180,754
General Cable Corp.	1,637,612	1,628,298	1,222,466	3,265,910	1,008,939*
Greenfield Tap & Die Corp.	209,079	244,926	277,695	454,005	445,425
Holland Furnace Co.	825,250	118,598*	401,999	706,652	331,008
Houdaille-Hershey Corp.	1,746,579	836,065	211,549	2,582,644	57,453*
International Business Machines Corp.	6,024,913	5,303,148	4,115,460	11,328,061	8,188,770
Kalamazoo Stove & Furnace Co.	22,743	41,267	94,822*	64,010	123,195*
Line Material Co.	695,202	407,072	144,642	1,102,274	229,663
Lynch Corp.	345,519	295,561	101,052	641,080	294,379
Mack Trucks Inc.	2,039,576	1,380,759	1,780,032*	3,420,335	1,093,373*
Marion Power Shovel Co.	238,458	211,638	372,175	450,096	49,015
Minneapolis-Honeywell Regulator Co.	1,493,828	1,808,515	977,707	3,302,343	1,630,666
Monarch Machine Tool Co.	160,357	194,320	159,354	354,677	283,751
Mullins Mfg. Corp.	1,364,996	959,585	708,842	2,324,581	20,844
Nash-Kelvinator Corp.	4,194,801	4,322,508	1,274,527	8,517,309	121,752
National Acme Co.	616,270	605,435	525,534	1,221,705	1,159,332
National Cash Register Co.	2,637,131	2,373,670	601,613	5,010,801	258,406
National Supply Co.	2,151,633	1,771,025	631,553	3,922,658	1,242,310
Noblitt-Sparks Industries Inc.	618,532	372,491	482,575	991,023	35,383
Simonds Saw & Steel Co.	751,789	858,892	757,228	1,610,681	1,228,124
Square D Co.	1,077,241	784,545	419,776	1,861,786	775,881
Studebaker Corp.	1,932,218	1,655,760	171,040*	3,587,978	300,800*
Symington-Gould Corp.	18,614	20,859	359,749	39,473	137,741*
Twin Coach Co.	486,000	332,700	404,197*	818,700	732,800*
United-Carr Fastener Corp.	249,907	368,511	85,436*	618,418	7,263
U. S. Hoffman Machinery Corp.	324,173	308,516	444,092	632,689	838,028
Victor Equipment Co.	94,103	101,925	100,407	196,028	109,181
Westinghouse Air Brake Co.	3,195,892	3,382,263	1,879,465	6,578,155	4,292,710
Weston Elec. Instrument Corp.	96,969	309,683	347,945	406,652	618,820
Worthington Pump & Machinery Corp.	1,474,897	1,702,657	1,807,220	3,177,554	256,680
Yale & Towne Mfg. Co.	667,525	556,355	24,167	1,223,880	718,604*
Totals	$55,895,660	$52,731,515	$24,043,823	$108,627,175	$29,476,852

*Net loss.

ASTE Plans For Semiannual Boston Meeting

Society expects attendance of 3500 at convention scheduled Oct. 30-31 and Nov. 1, W. B. Peirce announces

AMERICAN Society of Tool Engineers will hold its semiannual convention Oct. 30-31 and Nov. 1 at the Statler Hotel in Boston with an expected attendance of 3500, President W. B. Peirce announced last week.

"More efficient tools will lead the way to a sounder economy," Mr. Peirce declared. "The best way we know to bring about this increased efficiency is through the free exchange of information and ideas in meetings such as the Boston convention."

Featured at the three-day session will be a series of technical meetings covering a wide range of subjects. In addition, more than 20 varied industrial plants in the Boston area will be opened for tours by the ASTE convention visitors. On Nov. 1, all the Massachusetts Institute of Technology's engineering laboratories will hold open house.

Pointing out that better tools and machines will result in better living, not only in this country but throughout the world, Mr. Peirce reported that at this meeting unusual emphasis will be placed on the beneficial effect well engineered machines and tools will have upon the world's social, political and economic life.

Porcelain Enamel Institute Schedules Annual Forum

The Porcelain Enamel Institute's 9th Annual Forum, to be held Sept. 10-12 at Ohio State University, Columbus, O., will concern pertinent operating and technical problems which currently face the porcelain enameling industry.

The program will include a visit to the University's Department of Ceramic Engineering, a forum on specific applications of porcelain enamel, a discussion of different systems of metal surface preparation, a symposium on fuel oils.

American Welding Society To Hold Meeting Oct. 19-24

American Welding Society has completed the tentative program for its 28th annual meeting to be held Oct. 19-24 at the Hotel Sherman, Chicago, during the National Metal Exposition. A total of 70 papers covering 16 classifications of welding applications and research will be presented at the 20 technical sessions during the week.

Highlighting the meeting will be the Adams Lecture by G. S. Mikhalapov, manager, Apparatus Research, Air Reduction Sales Co., awards of prizes and medals; the university research conference and the section conference.

Instrument Society Expects 7500 at Chicago Meeting

Over 7500 persons are expected to attend the Second National Instrument Conference when it gets under way at the Stevens Hotel in Chicago, Sept. 8-12. The gathering, sponsored by the Instrument Society of America, will be under the general chairmanship of A. F. Sperry, president of Panellit Inc., Chicago.

Announce Joint Regional Meetings for 1947-48

A schedule of joint regional meetings for the 1947-1948 season has been announced by American Supply & Machinery Manufacturers' Association, Pittsburgh; National Supply & Machinery Distributors' Association, Philadelphia; and Southern Supply & Machinery Distributors' Association, Richmond, Va.

The two former groups will participate in sessions on Oct. 31 at the Netherland Plaza, Cincinnati; during November at a date to be announced later in Newark, N. J.; on Jan. 14, 1948, at the Copley Plaza, Boston; and on March 23, 1948, at the Palmer House, Chicago. All three organizations will participate in a meeting Jan. 8, 1948, at the Edgewater Gulf Hotel, Biloxi, Miss.

Metal Exposition Slated For Chicago, Oct. 18-24

National Metal Exposition will be held in Chicago's International Amphitheatre Oct. 18-24. W. H. Eisenman is managing director of the show and is also secretary of the sponsoring organization, American Society for Metals.

The exposition will be held concurrently with the National Metals Congress. In addition to the ASM sessions, technical meetings will be held by the American Industrial Radium & X-Ray Society, the American Welding Society, the Iron & Steel Division and the Institute of Metals Division of the American Institute of Mining & Metallurgical Engineers.

Calendar of Meetings . . .

Aug. 21-22, Society of Automotive Engineers: West Coast transportation and maintenance meeting, Biltmore Hotel, Los Angeles.

Aug. 22-23, Institute of Scrap Iron & Steel: Mid-year convention, French Lick Springs Hotel, French Lick, Ind. Executive secretary is Edwin C. Barringer, Normandy Bldg., Washington.

Aug. 28-Sept. 13, British Engineers' Association: Engineering and marine exhibition, London. Association headquarters are at 32 Victoria St., London, S. W. 1.

Aug. 30-Sept. 13, Association Des Ingenieurs: Centenary exposition, Liege, Belgium.

Sept. 1-4, American Society of Mechanical Engineers: Fall meeting, Hotel Utah, Salt Lake City, Utah.

Sept. 5-7, Institute of Scrap Iron & Steel Inc.: Southern chapter meeting, Wrightsville Beach, N. C., with Ocean Terrace Hotel as headquarters. Institute executive secretary is Edwin C. Barringer, 1626 K St. NW, Washington.

Sept. 8-12, Instrument Society of America: Second national instrument conference and exhibit, Stevens Hotel, Chicago. Richard Rimbach, 1117 Wolfendale St., Pittsburgh 12, executive secretary.

Sept. 10-12, Porcelain Enamel Institute: Ninth annual forum, Ohio State University, Columbus, O.

Sept. 12-13, American Foundrymen's Association: Regional conference of Eastern Canada and Newfoundland chapter at Sherbrooke, Que. Chapter chairman is A. E. Cartwright, Crane Ltd., Montreal.

Sept. 14-20, Eastern States Exposition. Industrial Arts Bldg., Springfield, Mass. General manager is Charles A. Nash.

Sept. 15-19, American Chemical Society: National meeting in New York. Society headquarters are at 60 E. 42nd St., New York.

Sept. 17-18, Society of Automotive Engineers: Tractor meeting, Hotel Schroeder, Milwaukee.

Sept. 17-26, National Machine Tool Builders' Association: Machine Tool Show, Dodge-Chicago plant, Chicago. Machine Tool Congress in connection with show to be held in various Chicago hotels. Association headquarters are at 10525 Carnegie, Cleveland.

Sept. 18-20, National Association of Foremen: 24th annual meeting in Los Angeles. Headquarters will be at the Philharmonic Auditorium and the Biltmore Hotel.

Sept. 22-25, Association of Iron & Steel Engineers: Annual meeting, Hotel William Penn, Pittsburgh.

Sept. 23-26, Institute of Metals (British): 39th annual autumn meeting, Glasgow, Scotland. Institute secretary is S. C. Guillan, 4 Grosvenor Gardens, London.

Sept. 27: Symposium on Modern Metal Protection: Sponsored jointly by Cleveland sections of American Chemical Society, Electrochemical Society and American Institute of Chemical Engineers at Hotel Carter, Cleveland.

Oct. 2-3, Gray Iron Founders' Society: 19th annual convention, Hotel Schroeder, Milwaukee. Society headquarters are at 1010 Public Square Bldg., Cleveland.

Oct. 2-4, Society of Automotive Engineers: Autumn aeronautic meeting, Biltmore Hotel, Los Angeles.

Oct. 6-7, Packaging Machinery Manufacturers Institute: 15th annual meeting, Hotel Sheraton, Springfield, Mass. Institute headquarters are at 342 Madison Ave., New York.

Oct. 6-8, American Society of Mechanical Engineers: Petroleum mechanical engineering conference, Houston, Tex.

Oct. 9-10, Porcelain Enamel Institute: Annual meeting, Cleveland.

Oct. 15-18, Electrochemical Society: Boston Congress, Copley-Plaza Hotel. Society secretary is Colin G. Fink, 3000 Broadway, New York.

Dealers Prepare For Rise in New Tool Demand

Hopes of builders based on interest in National Machine Tool Show. WAA steps up sales activities

INTEREST in new machine tools is swelling as the September show date nears. Numerous builders have already exhibited new models to their salesmen and distributors, who are preparing for a spurt of buying following the show at the Dodge-Chicago plant. Segments of the trade are now quoting prices and delivery dates for the new designs, although a large number of potential buyers are holding back on firm orders until the machines can be seen in operation.

Optimism is felt by builders over prospects of the increased demand which will stem from the show and indications point to higher rates of production in the industry to satisfy this demand. In addition, generally, the decline in ordering which has been experienced this summer has not been as sharp as was anticipated earlier this year by the trade.

In the Cincinnati district, recent ordering of new tools has been on the basis of approximately 50 per cent domestic and 50 per cent foreign, the latter still being handicapped by difficulties in financing.

In the Cleveland WAA region, new plans have been formulated to aid in the disposal of WAA's largest machine tool and other production equipment inventories. These inventories as of June 30 totaled $72,600,000. Sixteen offerings are currently being made in the region.

The new program will be fully explained to dealers Aug. 20 at a meeting in the Hotel Allerton, Cleveland. Similar meetings are to be held in Toledo's Commodore Perry Hotel, Aug. 22, and in the Fort Pitt Hotel, Pittsburgh, Aug. 26.

EARLY ARRIVAL: Valued at $250,000, an eight-car trainload of precision grinders leaves the Landis Tool Co. plant at Waynesboro, Pa., headed for the Machine Tool Show at Chicago, Sept. 17-26. Installation of the exhibit was completed Aug. 5

July Steel Ingot Output Shows 400,000-Ton Decline

A decline of approximately 400,000 tons of steel ingots and steel for castings from the June output was reported for July by the American Iron & Steel Institute. Production for the latest month was 6,572,185 tons, compared to 6,968,665 tons in June. The decline reflected the effects of the Fourth of July holiday and idleness at the coal mines.

Production during the first seven months of the year totaled 48,855,838 tons compared with 33,952,604 tons in the corresponding period of 1946.

Steelmaking furnaces operated at 85.0 per cent of capacity in July compared with 92.8 per cent in June and 84.9 per cent in July, 1946, when production was 6,618,683 tons.

Shipments of Steel Products Hold Steady in June

Net shipments of steel products held steady in June at 5,263,711 tons compared with 5,442,343 tons in May, according to the American Iron & Steel Institute. The decline in total tonnage was due principally to the shorter month, the daily rate of shipments having held practically unchanged. Total shipments for the first six months came to 31,172,157 tons compared with 20,301,058 tons in the like 1946 period.

In addition, shipments to members of the industry for conversion into further finished products or for resale totaled 479,463 tons in June and 2,237,257 in the first six months of this year.

Net shipments in tons in June and in the first six months of this year, respectively, included the following: Hot-rolled bars 780,950 and 4,772,861, accounting for about 15 per cent of total shipments; cold-finished bars 134,836 and 916,529; hot-rolled sheets 582,030 and 3,574,699; cold-rolled sheets 460,980 and 2,687,427; galvanized sheets 130,542 and 791,802; hot-rolled strip 141,121 and 868,706; cold-rolled strip 138,125 and 813,064; hot-dipped tin and terne plate 167,069 and 967,251; electrolytic tin and terne plate 140,931 and 733,781; drawn wire 218,954 and 1,289,427; seamless pipe and tubes 178,080 and 1,048,559; butt weld pipe and tubes 148,099 and 833,737; standard rails 188,168 and 1,117,182; sheared and universal plates 563,354 and 3,135,342; ingots, blooms, billets, tube rounds, sheet and tin bars, etc. 234,806 and 1,325,962; and heavy structural shapes 364,295 and 2,224,063.

STEEL INGOT PRODUCTION STATISTICS

	Estimated Production—All Companies								•Calculated weekly	
	—Open Hearth—		—Bessemer—		—Electric—		—Total—		production all	Number of
1947	•Net tons	Per cent of capac.	Net tons	Per cent of capac.	•Net tons	Per cent of capac.	•Net tons	Per cent of capac.	companies Net tons	weeks in mo.
Jan.	6,544,841	95.1	384,096	87.7	284,309	65.9	7,213,246	93.0	1,628,272	4.43
Feb.	5,830,371	93.8	314,912	79.6	276,779	71.1	6,422,062	91.7	1,605,515	4.00
Mar.	6,614,369	96.1	378,893	86.5	314,224	72.9	7,307,486	94.3	1,649,545	4.43
1st qtr..	18,989,581	95.0	1,077,901	84.8	875,312	69.9	20,942,794	93.1	1,628,522	12.86
Apr.	†6,360,600	95.4	375,675	88.6	†306,422	†73.4	†7,042,697	93.8	†1,641,654	4.29
May	6,634,716	96.4	372,878	85.2	321,903	74.6	7,329,497	94.5	1,654,514	4.43
†June ...	6,312,674	94.7	351,247	82.8	304,744	73.0	6,968,665	92.8	1,624,397	4.29
†2nd qtr.	19,307,990	95.5	1,099,800	85.5	933,069	73.7	21,340,859	93.7	1,640,343	13.01
†1st 6 mos. .	38,297,571	95.3	2,177,701	85.2	1,808,381	71.8	42,283,653	93.4	1,634,467	25.87
‡July ...	6,033,408	87.9	256,125	58.6	282,652	65.7	6,572,185	85.0	1,486,920	4.42

† Revised. ‡Preliminary figures subject to revision.

For 1947, percentages of capacity operated are calculated on weekly capacities of 1,553,721 net tons open hearth, 98,849 net tons bessemer and 97,358 net tons electric ingots and steel for castings, total 1,749,928 net tons; based on annual capacities as of Jan. 1, 1947, as follows: Open hearth 81,010,990 net tons, bessemer 5,154,000 net tons, electric 5,076,240 net tons, total 91,241,230 net tons.

Rise in Labor Productivity Rate Indicated

First substantial postwar gain, about 5 per cent overall, seen by some labor students during first half of 1947

LABOR productivity declined during the war years due to widespread hiring of inadequately trained and less capable workers. After V-J Day there were doubts whether the historic record of continuous improvement would be resumed; the general attitude of labor during the immediate postwar period did not seem conducive to resumption of the old trend line.

Unfortunately, due to the fact that the Bureau of Labor Statistics has lost half its statistical staff as a result of the economies ordered by Congress, no productivity statistics will be available immediately. In fact, present indications are the bureau will not attempt to perform a statistical job on productivity until after the Census Bureau reports the 1948 Census of Manufactures. That means that no thoroughgoing figures will be available before the fall of 1948.

Estimate Rise at 5 Per Cent

In the meantime, the best guess is that productivity in the first half of 1947 reflected the first substantial postwar gain. This was due to the great reduction in labor stoppages, as well as to the fact that working forces in general showed the results of more intensive training. Some labor students are of the opinion that the productivity gain in the first half of 1947 may average 5 per cent—more in some industries than in others, but as much as 5 per cent across the board. They report a more general understanding on labor's part that increased productivity has a direct tie with the cost and scale of living and that further productivity increases can be expected.

An impressive proof of this disposition is afforded by the report of the Labor Committee of the National Planning Association which urges management-labor co-operation to increase productivity. It starts out with this flat, unqualified declaration:

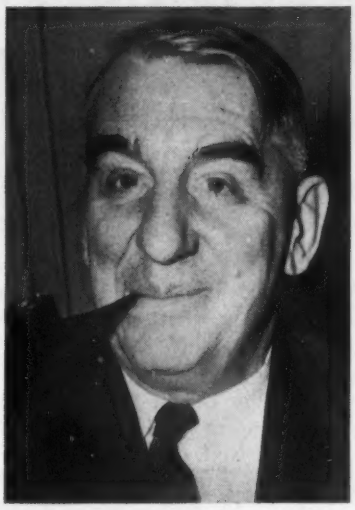
"Our economic efficiency as a nation depends upon our productivity." The report was signed by 33 labor leaders, many of them nationally known, and representing the main unions.

Clinton S. Golden, the committee's chairman, told a press conference that he thought the report could be regarded as an expression of the overwhelming attitude of labor leaders. Mr. Golden, formerly vice president of the United Steel Workers—CIO, now is labor lecturer at Harvard University. In reading the report, Mr. Golden stressed this part:

"Workers increasingly realize that high wages are made possible and continuation of their rising trend can be insured only by the high and increasing productive efficiency of our economy."

Labor generally, he believed, is in a mood to respond to calls by management for greater efficiency, and smart management will get good results by setting definite goals and by frankly putting all the cards on the table. The workers, he insisted, are not going to put in their best efforts merely to swell profits for the stockholders. Nor are they going to get enthusiastic if they find that cost sheets submitted by an employer are loaded with dubious items.

"To get co-operation," said the Labor Committee's vice chairman, Marion H. Hedges of the International Brotherhood of Electrical Workers—AFL, "the management must convince the employees that they are going to get a fair share of the benefits resulting from increased and more efficient production. In general, the workers want higher wages and lower prices. On that kind of a platform, smart management should be able to earn greater profits through increased productivity."



MEDIATION HEAD: Cyrus S. Ching, former vice president in charge of industrial relations, United States Rubber Co., has been appointed chief of the new Federal Mediation & Conciliation Service created by the Taft-Hartley labor law. He was an industry member of the National War Labor Board and has served the government in various other capacities

Fabricators Are Queried About Labor Relations

Questionnaire seeks to show how non-basic steel interests fared in collective bargaining this year

NON-BASIC Steel Co-ordinating Committee has sent a questionnaire to its more than 1000 members in various steel fabricating fields to ascertain how they fared in collective bargaining this year with the United Steel Workers—CIO.

In general, the union was more liberal this year in allowing for special local conditions. Also, in general, individual contracts contain more provisions covering fringe issues raised by the union or by the employers.

The purpose of the committee is to ascertain how the fabricators' labor contracts have shown the influence of the Taft-Hartley Act. After that, the committee will undertake to formulate a digest of such legislative needs as still may be found to exist.

The new, enlarged National Labor Relations Board, created to administer the Wagner Act as amended by the Taft-Hartley Act, is engaged in a continued series of organizational and preparatory meetings. Some appointments of key personnel will be announced shortly. The board is devoting much time to the writing of a statement covering its future policies in administering the two laws. This should be published about the time the main provisions of the Taft-Hartley Act go into effect Aug. 22.

On the hill, the Joint Congressional Committee to Study Labor-Management Relations has launched its study of the labor-management relations history of some 20 to 25 representative corporations. The main question to which an answer is sought, according to Edward A. McCabe, the joint committee's executive director, is: What makes and shapes labor-management relations? Is it the pattern in the contract? Is it the personalities on both sides? In other words, what is the limit of the influence that can be wielded by the purely legislative approach?

After this study has been completed—a job that will call for more help than the committee's two investigators and several stenographers can give—the members of the joint committee will hold a meeting and decide what to do next. In general the members of the committee are satisfied that the Taft-Hartley Act, to date, has exerted a good influence toward labor-management peace.

Windows of Washington

By E. C. KREUTZBERG *Washington Editor, STEEL*

Competition of government-owned corporations with private business to be probed at hearings to be started in fall by House Small Business Committee. Groundwork for investigation being prepared

THE MANY lines of business that in recent years have suffered from the competition and the rules laid down by government-owned corporations will have a chance to voice their complaints at hearings to be conducted this fall by the House Small Business Committee's Government in Business Subcommittee. Headed by Rep. Evan Howell (Rep., Ill.), the subcommittee plans to hold hearings in many cities starting in September.

To lay the groundwork for the investigation, the subcommittee recently engaged Willis J. Ballinger as its executive director. Mr. Ballinger was for 10 years economic adviser to the Federal Trade Commission and a key figure in a number of government investigations of business. Rep. Walter C. Ploeser (Rep., Mo.), chairman of the House Small Business Committee, characterizes him as a "staunch defender of capitalism as the bulwark of our democracy."

The investigation is the result of numerous complaints from business men that they are injured by competition from the government. A principal feature will be the hearing of evidence as to how private business is harmed by the tax exemption privileges that are enjoyed by co-operatives and foundations. The subcommittee also hopes to get some slants from business men that will help to suggest a sound government policy covering the furnishing of financial and other assistance to business.

The government corporations and agencies to be covered in the investigation are:

Commodity Credit Corp.
Defense Homes Corp.
Export-Import Bank of Washington.
Federal Crop Insurance Corp.
Federal Farm Mortgage Corp.
Federal intermediate credit banks.
Federal Loan Agency—including the Reconstruction Finance Corp., Federal National Mortgage Association, Rubber Development Corp., RFC Mortgage Co., U. S. Commercial Co., War Damage Corp.
Federal Public Housing Authority.
Federal Prison Industries Inc.
Federal Savings & Loan Insurance Corp.
Home Owners' Loan Corp.
Inland Waterways Corp.
Institute of Inter-American Affairs.
Inter-American Educational Foundation Inc.
Panama Railroad Co.
Production credit corporations.
Regional Agricultural Credit Corp.
Tennessee Valley Authority.
Virgin Island Co.
Warrior River Terminal Co.

Assets of these corporations July 1, 1947, aggregated in the neighborhood of $15 to $16 billion. The committee, says Mr. Ploeser, wants to place before the American public "full information of the alarming growth of government in business in the United States," and has very much in mind the warning conveyed by the "doleful picture of British socialism in the world news."

DAVID W. E. BRUCE
Recently appointed assistant secretary of commerce

Wage-Hour Legislation

Employers interested in possible revisions of the Fair Labor Standards Act of 1938, as amended by the Portal Pay Act of 1947, will want to write and ask the House Committee on Labor & Education for a copy of the printed record of its recent hearings. These were called originally for the single purpose of considering H. R. 3886, introduced by Rep. Gerald W. Landis (Rep., Ind.), to increase the minimum wage from 40 to 60 cents.

The subcommittee soon found, however, that the minimum wage was only one of the questions that needed consideration. So Chairman Samuel K. McConnell Jr. (Rep., Pa.) recently announced that the hearings to be held this fall will deal with all contemplated revisions of the hours and wages law. Included in the subjects to be considered will be the Wages & Hours Administration's rules governing exemptions under the overtime provisions of the Fair Labor Standards Act. These hearings will be especially important because the Senate Labor & Public Welfare Committee is leaving the whole assignment to the House Committee and will not do anything on wages and hours until the House has acted.

A point of view on the subject of the minimum wage that will come up for airing at the fall hearings is discussed in a report just issued by the Economic Policy Committee of the Chamber of Commerce of the United States. It suggests that a minimum wage policy is not all that it is cracked up to be for the simple reason that when employers cannot afford to pay the minimum wage for certain jobs for which they could pay less, the net result is discharge of the workers.

Patent Accord Delayed

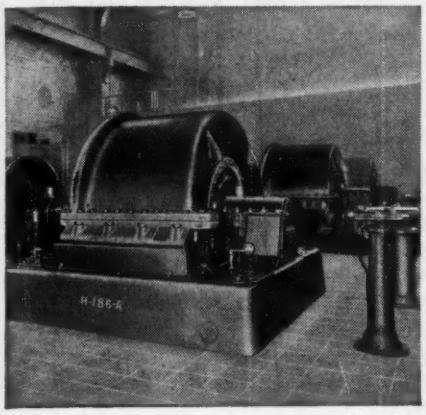
State Department officials have sent several protests in recent weeks to Paris because of failure of French government officials to carry out a commitment made at the International Patent Accord Conference in London in 1946. At that meeting, the nations which had vested patents formerly owned by German nationals agreed to make these patents available to each other on a non-exclusive, royalty-free basis. The French volunteered to serve as clearing house, obtaining information on the German patents held by each country, and circulating this information to all the countries. While the accord became operative Jan. 1, 1947, it has been unable to function because of failure of France to carry out this duty.

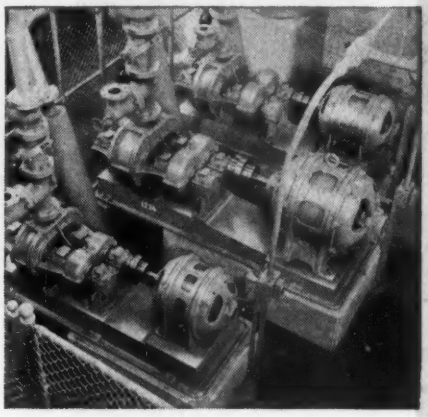
The protests of the State Department are prompted by the desire of many American manufacturers to obtain licenses to do business under these originally-German patents; and in order to apply for such licenses they need information about the patents, their serial numbers, and what processes and products they cover.

More Army Scrap Likely

Under a new item in the War Department appropriation for fiscal 1948 the various Army services will be encouraged to generate more scrap and salvage material and sell it in the market. Formerly, outside of a special appropriation to the Ordnance Department for demilitarizing explosive ammunition and other

R-C *dual-ability* DEVISES *Wind-makers* TO GUARD WATER SUPPLIES!





Safe, clean water usually depends upon the protection of supply sources through sewage purification. Many modern plants use Roots-Connersville Blowers to help remove impurities and thus allow the resultant purified water to be returned to lakes and streams for re-use by homes and industries.

The same R-C *dual-ability* which devises these essential blowers is responsible for the successful, dependable performance of man-made "wind-makers" in practically every industry and in a wide variety of applications. Our capacity to supply either Centrifugal or Rotary Positive types enables us to meet the exact needs of each installation, without prejudice.

Advanced engineering, plus almost a century of blower building experience, enhances the value of this completely independent thinking. The result is that R-C Blowers fit the job and can be relied upon for many years of economical, trouble-free operation.

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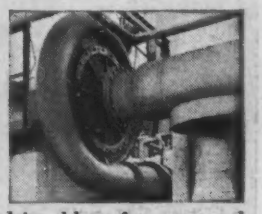
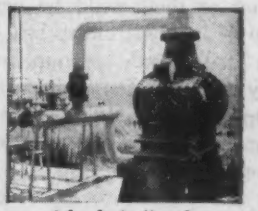


Centrifugal Blower

Used in oil refining, 11,750 CFM capacity. Similar R-C Blowers are widely used in foundries, blast furnaces and other industries requiring high capacity equipment for boosting or exhausting air or gas.

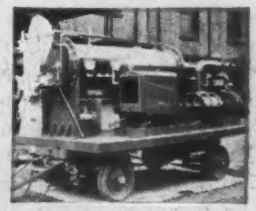
Rotary Positive Blower

Compactness of R-C Blowers suits them to many kinds of built-in applications. This portable aerator, with gas-engine drive, supplies air to fish in hatchery ponds, when the surface is entirely frozen over.



Positive Displacement Meter

Measures and records gas furnished by a public utility to an industrial consumer. R-C Meters with their "cash register" accuracy, measure or proportion any quantity of air or gas up to 1,000,000 CFH.



Inert Gas Generator

Provides protection, economically and efficiently, against fire and explosion hazards, where inflammable gases or liquids are processed or handled. Standard blower and gas pump are incorporated in unit.

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R-C *dual-ability* will help you select the right air or gas handling equipment for your specific needs. Consult us without obligation.

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NAME_____
TITLE_____

SNYDER IN PERU: Returning to the United States after a visit in Brazil, Secretary of Treasury John W. Snyder, center, stops off in Lima, Peru. Shown at the airport are, left to right: Prentice Cooper, United States ambassador to Peru; Secretary Snyder; and Dr. Luis Echecopar Garcia, minister of commerce in Peru. NEA photo

items so they could be handled safely, the War Department has had to draw on its general appropriation dollars to pay such expenses as preparing, bundling, shipping and advertising scrap, and paying auctioneers' fees. Now the War Department has a special appropriation of $25 million to meet such expenses. It will get this money from sales of scrap and salvage materials.

Incidentally, the War Department's scrap and salvage business is of larger volume than is generally realized. Proceeds from such sales aggregated more than $94 million in 1944, more than $91 million in 1945, more than $67 million in 1946 and, in 1947 first half more than $25 million. Previously this income had to be deposited in the Treasury.

Now that $25 million of these funds are available, the quantity of Army ferrous and copper scrap should be much larger, for the Army has large numbers of guns to be cut up, many tanks and special vehicles to be dismantled, huge quantities of ammunition to be freed of their explosive charges, etc. The appropriation may be spent on scrap and salvage both at home and abroad. War Department officials now are studying the whole subject and will decide such questions as the extent to which Army scrap will be prepared and sold by dealers.

Seeking Foreign Patents

First industry to take advantage of President Truman's Executive Order No. 9865, calling upon government agencies to patent government-owned inventions abroad, is the radio industry. This industry is using hundreds of government-owned patents that have not yet been published. Unless these inventions are patented abroad, foreigners will be in a position to use them freely upon publication. That might mean low-priced competition in world markets due to the fact that unit labor costs are lower in the other countries.

The industry is handling this matter through the Radio Manufacturers Association, Washington. It is questioning members as to the serial numbers of the particular patents that should be filed abroad for the protection of the American industry. Resulting information will be reported to the Office of Technical Services, Commerce Department, which has charge of administering the President's order. All expenses incidental to obtaining foreign patents will be borne by the radio industry.

Export Controls Revised

Revision of controls on exports of certain iron and steel products was announced last week by the Office of International Trade, Department of Commerce.

Exports of between 40 and 50 steel mill products, which now may be shipped abroad under consolidated licenses issued by the OIT will become subject to individual licensing Oct. 1, the OIT said.

Under the consolidated license system, exporters may ship licensed quantities of steel products to any country, except occupied countries and certain other areas. Under individual license, an exporter must apply separately for each item he wishes to ship, stating the name of the consignee, the country, and the use to which the commodity is to be put.

Consolidated licenses are issued within a total export quota which this government determines may be shipped out of the country without endangering the domestic economy, but without regard to distribution among foreign countries. Under the individual license system, however, country quotas based on relative need, are established within the total to be authorized for export.

Export quotas of iron and steel products for the fourth quarter will be announced at a later date, the OIT said. It is not expected it will be necessary to depart markedly from the present method of distribution of the quota among American exporters.

Returning To Washington

Additional government agencies to be moved back to Washington by the end of 1947 include Interior's Indian Bureau, Fish & Wildlife Service and National Park Service, now in Chicago; the Securities & Exchange Commission, now in Philadelphia; the Civil Service Commission's Fourth Regional office, now in Winston-Salem, N. C.; the Immigration & Naturalization Service, now in Philadelphia. All were moved out of Washington to make room for wartime agencies.

Named Aeronautics Secretary

John R. Alison has been appointed assistant secretary of Commerce for aeronautics, succeeding William A. M. Burden who resigned June 30. Mr. Alison, Gainesville, Fla., is a former Army Air Forces colonel who served as adviser on American aircraft available to other nations under lend-lease. He was United States air attache to the Soviet government in 1941-1942, and later had charge of lend-lease co-ordination in the Persian gulf area. Mr. Alison was graduated from the University of Florida in 1936 in engineering and business administration.

Advocates Lignite Research

Although lignite constitutes nearly one-third of the nation's solid fuel tonnage reserves, American research for full industrial and domestic utilization of this source of energy has been less extensive than in Germany with similar coal, according to statements recently presented by the Bureau of Mines before the Mining Subcommittee of the House Committee on Public Lands.

The subcommittee recently held hearings on a bill (H. R. 2543) to provide $750,000 for the establishment, and $250,000 annually for maintenance and operation of a research laboratory in the North Dakota lignite-consuming region.

Atomic Energy Commission Asks Greater Participation in Program

Many individuals and organizations now engaged in other pursuits must help in development of atomic research if United States is to maintain and increase lead in field of nuclear physics, chemistry and metallurgy

IF THIS country's pre-eminence in the field of atomic energy is to be maintained and increased, then "many talented persons and many well-managed industries and other private undertakings now otherwise engaged must actively participate in the atomic energy program, even if this requires that for a time they set aside what they are now doing."

This is a principal conclusion voiced by the Atomic Energy Commission in its second semiannual report to Congress.

"The continuation, or even improvement, of processes of present type is not enough. To rely on present knowledge alone would be disastrous. New efforts in fundamental research must be made comparable in intensity and breadth of imagination to the wartime effort which produced the world's first nuclear chain reactor and the first atomic bomb. Innumerable technological difficulties now standing astride the road of progress must be overcome."

U. S. Seeks Pre-eminence

Principal attention is being given to production of fissionable materials and atomic weapons at the Los Alamos Laboratory near Santa Fe, New Mex., and "we mean to maintain and increase the present pre-eminence of the United States in atomic weapons until such time as Congress affirms that acceptable international agreements have been reached and the appropriate machinery has been established to assure that this activity can be relaxed without endangering the national security."

In addition, work is being done on a broad front in fundamental nuclear physics, chemistry and metallurgy. The Los Alamos Laboratory is doing important work in fundamental nuclear physics. The Argonne National Laboratory, near Chicago, has enlarged its facilities; it now has two experimental nuclear reactors and a third reactor of unique characteristics is in the design stage. The Clinton Laboratories at Oak Ridge, Tenn., are operating steadily on separation of the uranium-235 isotope in sufficient quantities for distribution to qualified applicants in various parts of the country. Production of plutonium is continuing at Hanford, Wash. The Brookhaven National Laboratory and the Knolls Atomic Power Laboratory are under construction, respectively, at Patchogue, N. Y., and Schenectady, N. Y.

Already 29 universities are participating in the work at Argonne, 14 at Clinton and nine share the supervision of the Brookhaven enterprise. Other "excellent" laboratories operated under contract with the commission are at Berkeley, Calif., Ames, Ia., Dayton, O., and Hanford, Wash. The report points out that important work for the commission is being done at Columbia University, Battelle Memorial Institute, and Massachusetts Institute of Technology. Altogether, the commission has more than 100 contractors and these in turn have several hundred subcontractors.

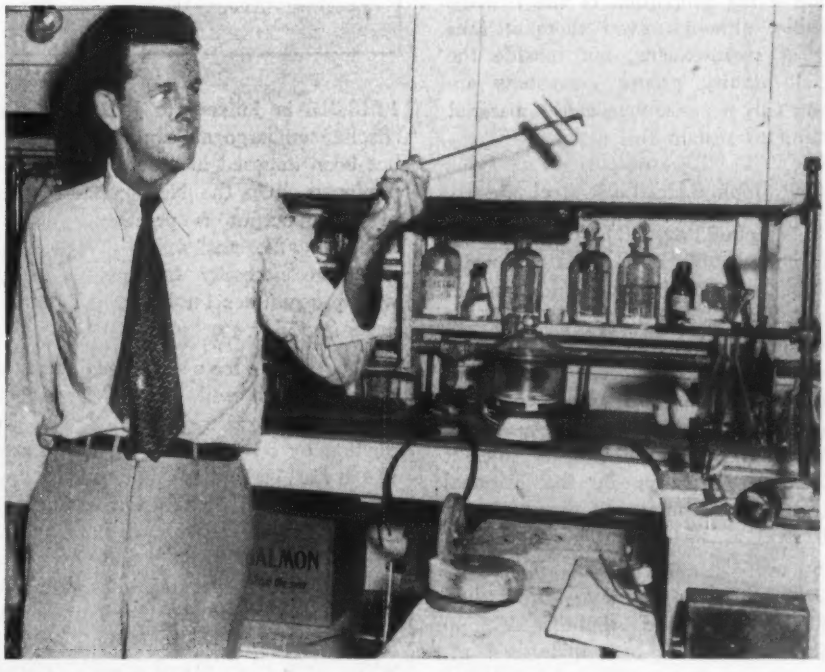
When the commission took over the activities of the Manhattan Engineer District, the atomic energy organization was centralized at Oak Ridge. Under a decentralization program, staff service headquarters have been located in Washington and major centers of operation have been established at New York and Santa Fe. Three others will be set up shortly, at Chicago, Oak Ridge and Hanford.

An important beginning, says the report, has been made at exploiting peacetime uses of atomic energy. Radioisotopes of more than 60 elements are being distributed in increasing quantities for research work.

"Large-scale production of power for industrial and community use continues to be a major, if long-term, goal," says the report. "The experimental reactors now being designed will provide much of the engineering data essential to such a power program. But a number of basic advances in physics, chemistry and metallurgy will be required before power is produced at satisfactory efficiency and cost.

"It is speculative, at this stage of development, to estimate how long it will be until power production units feasible for large-scale commercial use will be available."

Though the commission stresses the need for research work on a much larger scale, the report reveals a large group already working on atomic energy. The commission has on its payroll 4133 individuals. It also has the services of more than 900 officers and enlisted men from the Army. Including contractors' employees, the total number at work on atomic projects is 41,513.



WOULD HARNESS ATOM FOR METAL TESTS: James H. Stewart, chemical engineer of Beaumont, Tex., holds a stainless steel container of cobalt No. 60, made in the atomic energy chain-reacting pile of Monsanto Chemical Co.'s laboratories at Oak Ridge, Tenn. Stewart expects to use the radioactive isotope in the taking of x-ray pictures of metals and machinery to detect flaws in as much as 15 in. of metal. Acme photo

August Holidays Slow Down Steel Consumption, Production in Britain

Demand still far greater than supply. Priority industries fare best, but are short of requirements. Other industries operating at only partial capacity. Shipbuilding and automotive companies severely handicapped

BIRMINGHAM, ENG.

CONSUMPTION of iron and steel is likely to be slightly less during August which is the peak period as far as holidays are concerned. For the same reason, production at the steelworks will also be lower, though in view of the fact that most firms have backlogs covering very large tonnages of material the stoppages have not been of long duration. It is customary, however, for works to close for a few days during which time stock-taking is put in hand and major repairs are carried out.

Production is dependent upon coal and with an increased fuel allowance last month output figures were the best since November. There has, however, been a slight falling off again in the amount of coal available. Following the introduction of the five-day week absenteeism in the coal mines showed a decline but is now showing an increase. It is estimated that some years may elapse before the supply of steel can overtake demand. Priority industries are getting a big proportion of the tonnage available, although even there it falls short of requirements, but outside the special priority groups consumers are getting only a percentage of the material required to sustain full activity.

Shipbuilders Lack Steel

The shipbuilding industry could consume considerably more steel if it were available. Automobile manufacturers are severely handicapped by the lack of material and there are many instances where engineering work is held up for similar reasons. Plate and sheet mills are said to have six to nine months' work on hand. The mining industry since it has been taken over by the National Coal Board has increased its orders for such steel as sections, arches and light rails.

The position in regard to semifinished steel has improved slightly due to prompt distribution of semifinished recently imported from Canada, Belgium and Luxemburg. The arrival of this steel has helped rerollers in their task of supplying sheets, strip and other steels for industry. In the first half of the year the total imports of iron and steel amounted to 288,917 tons as compared with 226,819 in the same period of 1946. Of this year's total 128,624 tons consisted of semifinished steel. This figure compares with 141,189 in the same period of 1946, but on the other hand the six months' imports of steel ingots at 76,588 tons had practically doubled. There was a severe drop in the import of pig iron, only 1850 tons coming in against 12,992 a year ago. It has been necessary to curtail exports severely on account of the overwhelming demand at home and this is reflected in the figures for the first half which show a total of only 919,826 tons as against 1,213,019 in January to June, 1946. An absolute embargo on exports of pig iron has been imposed in order to help home producers. On the Northeast coast the pig iron output is practically all absorbed by the steel mills. This emphasizes the necessity for pushing ahead with preparations for bringing more furnaces into play.

A comprehensive modernization scheme which will have the effect of increasing ingot and finished bar production by 50 per cent has been started at the Earl of Dudley's Round Oak Steelworks in South Staffordshire. Contracts have been placed for equipment and site preparation work is under way but the installation program has been arranged in such a way that current production will not be curtailed seriously while work is in progress. The scheme includes the provision of a new steel melting plant of modern design and the replacement of old mills.

For a long time the scarcity of high phosphorus pig iron has been an embarrassment to foundries producing light castings. Reconstruction work in the building trade since the war has brought a large and urgent demand for castings and for many months the foundries have been operating below capacity levels because of the stringency of pig iron supplies. An indication of the seriousness of the position comes from an announcement by the Iron & Steel Board which points out that all applications for the purchase of pig iron and scrap are examined closely and the board may be compelled to withhold licenses in the case of iron foundries not already in operation unless the board's prior approval of the undertaking has been obtained. As indicated earlier, no further exports of any grade of pig iron will be permitted and this promises to make available for home consumption an additional 5000 tons of refined iron which can be used as a substitute for low and medium phosphorus iron in the engineering and specialty foundries. It is, however, the dearth of high phosphorus iron which is most acute, and there is no early prospect of relief. Steelmakers contend that their stocks of basic iron have been seriously depleted and more blast furnaces will have to be put into operation if expansion of steel production is to be achieved.

DEFER NATIONALIZATION

LONDON

Labor party members last week voted approval of the government's decision to defer nationalization probably for the duration of Britain's financial crisis. Meanwhile, the industry is proceeding with its modernization and expansion program (STEEL, **Aug. 11, p. 62**).

Operating Costs Rise Sharply in France

Financial results of some of the large French iron and steel undertakings for the year 1946 show that they are not in a position to sustain heavier charges than they are now bearing, such as increased wages, higher coal prices, without a corresponding increase of selling prices. A further difficulty is that certain prices charged for deliveries made in 1945 and 1946, both as regards raw material received and products sold, are still uncertain, owing to the complicated methods used for price calculations because of the numerous forms of control.

Czechoslovakian Steel Production Improves

Progress is reported in iron and steel production in Czechoslovakia. In May the output of pig iron was 123,581 metric tons; the output of steel was 215,434 tons and rolled products 133,751 tons. Exports of iron and steel were 31,803 tons, mainly tubes, merchant bars, plates and sheets. It has been announced that receipts from UNRRA during the activities of this organization consisted of 2,052 railroad trucks; 12,180 motor lorries; 75 locomotives; 3,464 tractors; 9,450 tons of cranes, mining and other machinery; 32,385 tons of nonferrous metals.

A commercial agreement has been ar-

ranged with Argentina for the exchange of grain and other raw materials against rolling mill products from Czechoslovakia. Similar agreements have been arrived at with Brazil, Chile and Uruguay.

Pig Iron Shortage Acute In Belgium, Luxemburg

Pig iron, especially foundry grades, is scarce in Belgium. Three thousand tons of Australian pig iron have arrived at Antwerp. It is hoped that increased tonnages will come from the Netherlands whence, according to the new commercial treaty just agreed upon, 100,000 tons of pig iron should be delivered in the next two years. On the other hand, the quota of Belgian and Luxemburgian exports of steel products to the Netherlands has been increased from 400,000 to 500,000 tons for the next 12 months. A fifth blast furnace is being built at the Marcinelle works of the Thy le Chateau Steel Co.

The expansion and modernizing of Belgian iron and steel works is proceeding. It is reported that the Esperance-Longdoz Co. in Belgium, and also the ARBED concern in Luxemburg, have placed contracts for a semi-continuous sheet rolling mill. Cockerill and Ougree-Marihaye are said to be contemplating a similar step, and Cockerill is planning installation of a tin plate mill of 60,000 tons annual capacity, which would bring the Belgian output up to 90,000 tons.

France Chief Beneficiary of United States Coal Shipments

Receives more than one-fourth of total exports. Threat of general strike averted as union leaders submit wage demands directly to National Assembly. France shows second highest increase in living costs in western world

PARIS

FRANCE was the leading beneficiary of American coal exports in the 12 months ended June 30, receiving 7,983,000 tons out of a total of 29,837,000 tons. Italy was next with 5,969,000 tons. Other countries which received more than one million tons were Belgium, with 2,582,000 tons, the Netherlands 2,334,000 tons, Denmark 1,850,000 tons, Sweden 1,469,000 tons and Norway 1,043,000 tons.

The threat of an immediate strike of the French government civil workers was avoided when the union leaders decided to submit their wage demands directly to the National Assembly. Premier Ramadier presented the case for the civil workers, resulting from their difficult economic situation, but he also emphasized the dangerous position of France faced with further currency inflation. Finally his proposals were accepted by the members of the Assembly.

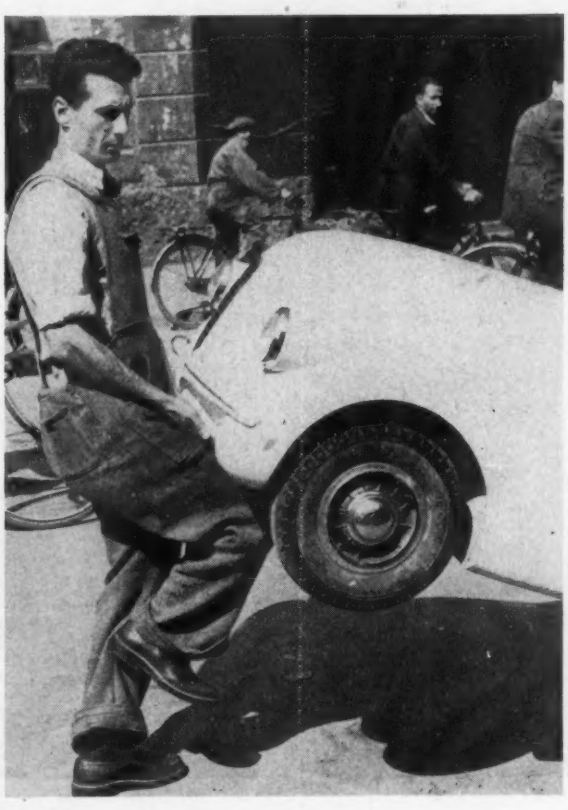
Representatives of the French Employers' Association and of the General Federation of Labor met for direct negotiations on collective wages and working conditions, to establish contracts for the coming year. Following the government's relaxation of its wage fixing policy, these direct negotiations between employers' and workers' organizations were the first to be held since before the war. The sessions were described as having been held in a friendly atmosphere. There were some divergences between the two parties, however, when the CGT, the workers' organization, claimed that the increased minimum living wage should be regarded as a basic salary with a corresponding increase for higher salaries and wages. At all events, these direct negotiations are full of promise and a quieter period is anticipated for the next months to come.

The cost of living indexes of different nations have been published recently. The following figures are based on each country's currency, taking 1937 as the basis for 100;—they apply to March, 1947:

Italy	2676
France	883
Turkey	354
Belgium	330
Czechoslovakia	309
Portugal	216
United States	157
Switzerland	151
Great Britain	133
Canada	128
Australia	127

These figures do not take into account income tax or government subsidies; the former is affected by the latter. As a result of a new policy of the French government, a certain number of goods and equipment has been decontrolled and the sales prices for these are now free.

French production has been seriously affected by the strikes in June, particularly the railroad and the coal strikes. Coal output in June was 3,401,000 metric tons, compared with 3,988,000 tons in May. The output of pig iron was 385,000 tons, against 428,000 tons in May; for steel ingots and castings, the output in June was 458,000 tons against 496,000 tons in May, and for rolled products the figures were 307,000 tons and 331,000 tons respectively.



MIDGET CAR: Italy's automobile industry is producing a new passenger car, 8 ft long and 3 ft wide. Engine is in the rear and drives the little car 100 kilometers on 3 liters of gasoline. Lombard Air Navigation Co., Milan, is the manufacturer. At left, a worker lifts the front of the car to show its lightness. NEA photo

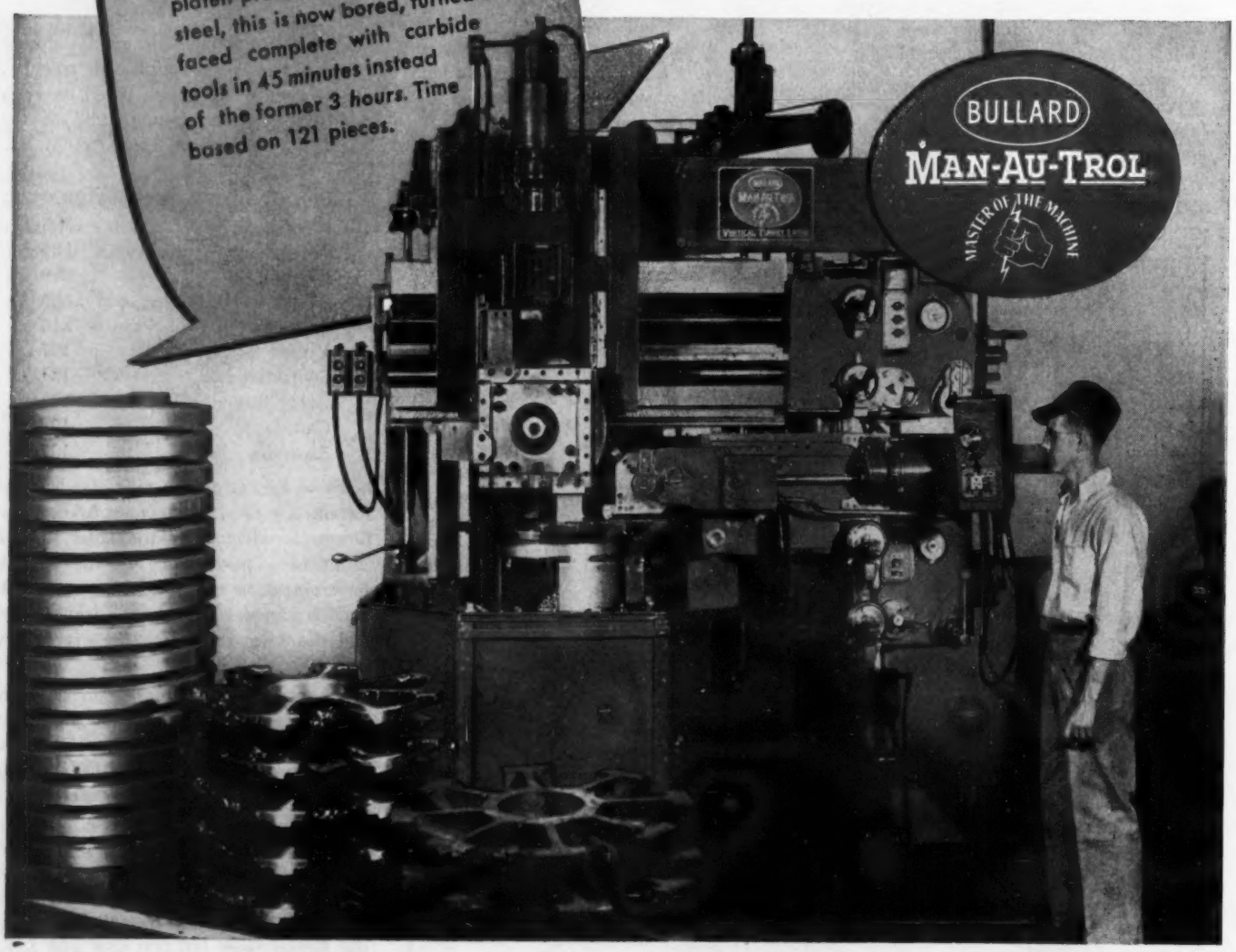
America's largest manufacturer of tire and tube curing presses reports:

Crank Gear Blanks Machined 12 Times Faster on a BULLARD Man-Au-Trol V. T. L.

BULLARD 36" Man-Au-Trol Vertical Turret Lathe is setting new production records for The McNeill Machine & Engineering Co., Akron 11, Ohio. For example: a crank gear blank of welded steel — O. D. 27.166" — which formerly took 4 3/4 hours, is now bored, finished and faced complete in 22 minutes in one setup except for the crank pin bore. Another with 28.500" O. D. is done in 27 minutes. All fractional dimensions held to 1/64" . . . all decimal dimensions to .005". Time based on 500 pieces, produced two months ahead of schedule.

Another job (illustrated here) is steam platen support for tire and platen presses: made of 1045 cast steel, this is now bored, turned and faced complete with carbide tools in 45 minutes instead of the former 3 hours. Time based on 121 pieces.

Investigate how the unique productivity, versatility and accuracy of **BULLARD** Man-Au-Trol Vertical Turret Lathes can give *you* substantial cost advantages in competitive markets. Write for Bulletin MAV-G-1 today. THE BULLARD COMPANY, Bridgeport 2, Connecticut.



BULLARD CREATES *NEW METHODS* TO MAKE MACHINES DO MORE

By A. H. ALLEN *Detroit Editor, STEEL*

Mirrors of Motordom

Recent interruptions to auto assembly schedules may prevent attainment of 5 million car goal this year. Heat and humidity combine to shorten tempers and cause walkouts in forging, painting and heat-treating departments

DETROIT

STEWING in 96-degree Michigan heat after three weeks of roaming around the East and Middle West listening to various and sundry persons tell what they think is wrong with the automobile industry, it is a little difficult to draw a sharp bead on just what goes at the moment around Detroit. Oppressive temperature and humidity of the past two weeks have made tempers short and have brought the usual disruptive effects on production. Many profess to see the anticipated 5,000,000-car-and-truck year gone aglimmering, perhaps by 500,000 units. The strike of 100,000 Ford employees was said to have been averted after 17 hours of the most strenuous type of "bargaining" as it is called. Crews in forging, heat treating and painting departments have walked off their jobs frequently as working conditions became nearly unbearable. Up at the Clinton Machine Co., Clinton, Mich., several hundred men and women who wanted to go back to the jobs, powered their way through a picket line, led by their 240-pound president, and many were scuffed up in the ensuing melee until state police took over.

Labor Law Caused Snags

Impasse in the Ford negotiations developed from the insistence of UAW-CIO on "Taft-Proofing" its agreement with Ford, plus some bickering over the retirement or pension plan. The former difficulty was ironed out by setting up a four-man committee—two from the company and two from the union—to work out a solution to the question of the union's liability for damages by suit for breach of contract on the part of the International Union, the local unions covered, their officers, agents or members. If the committee cannot agree unanimously within three months it will choose a fifth member, who may be the impartial umpire on the Ford contract, and will continue study of the matter for three-month periods up to a year's time until agreement is reached.

This appears a somewhat devious solution but is not construed as any violation of the Taft-Hartley Act and has the value of avoiding a work stoppage which looked to be dangerously close. For some reason the UAW-CIO will not agree to a similar truce in the case of the strike at Murray Corp. of America, which has snarled the flow of frames to Lincoln, Mercury, Dodge Truck and some others. In the Murray case, Emil Mazey, truculent head of the UAW east side local, said in so many words, "To put our position simply and bluntly, what we are saying is, in order for us to operate your plants, you will have to agree you will not sue the union under the provisions of the Taft-Hartley Act. . . even though that is the law of the land we have got to agree you are not going to use a law of the land."

There are some grounds for belief the furore over this damage suit provision of the new labor law is being generated by communist elements in the UAW who are using this hand-wringing over fancied dangers to their unions as merely a cover-up for their constant attempts to keep disturbances at fever pitch and thus promote industrial strife. Saner heads prevailed at Ford, as they undoubtedly will eventually at Murray.

It is not too clear just why the union was instituting new protests over the Ford retirement plan, after originally boasting of its success in winning such a plan for its membership. Here again, it may be the communist element at work. This contingent in the Ford local sneered at the retirement plan from its inception and tried to persuade Ford workers they might better have received the equivalent of the plan's cost in higher wage rates.

Automobile Production

Passenger Cars and Trucks—U. S. and Canada

Estimates by Ward's Automotive Reports

	1947	1946
January	373,872	126,082
February	399,717	84,109
March	441,793	140,738
April	449,388	248,108
May	390,629	247,620
June	418,919	216,637
July	397,926*	331,100
August		359,111
September		342,969
October		410,510
November		380,664
December		380,908
12 ms.		3,268,456

* Preliminary.

Estimates for week ended:

July 26	82,712	84,720
Aug. 2	97,712	79,385
Aug. 9	79,199	77,825
Aug. 16	88,000	86,990

Ford Pension Benefits

Further light was shed on the pension plan by John S. Bugas, Ford vice president and director of industrial relations, in a letter to the UAW. He estimated more than 90 per cent of the 107,000 Ford hourly paid workers will be able to retire at the normal retirement age (65 years) and receive a monthly income the remainder of their lives of between 40 and 70 per cent of their average monthly income in 1946 and thereafter, depending upon their period of service. At the outset of the plan, to provide time for readjustment by older employees, a graduated schedule of normal retirement ages will be in effect under which the normal retirement age will decrease gradually from 70 at the end of this year to 65 on Aug. 31, 1950. Retirements between 55 and 65 are permissible under certain circumstances. The union has reportedly been demanding optional retirement at 55 with full benefits.

The average base compensation of hourly-rated employees at Ford in 1946 was $2234, highest in the company's peacetime history. Thus the average employee who today at age 65 has been with the company since he was 30 and who retired at the end of this year, would receive a yearly retirement income of at least $1100, including individual social security benefits, or 50 per cent of his 1946 earnings. The total contribution of this employee to the plan during the seven months until the end of 1947 would be only $33. If he has a wife of 65, he would receive an additional $230 a year in secondary social security benefits, or a total yearly income of $1330—60 per cent of straight 1946 base earnings.

Similarly, a worker now 70, with 30 years' credited service, would be eligible for retirement at the end of the year on 52 per cent of his average 1946 base. Incidentally, about 7700 Ford hourly workers will be 65 or older by that date. About 50,000 workers will receive retirement benefits from the program during the next 15 years. By 1957, about 33,000 employees will have attained 65 or more, and 17,000 more will have attained retirement age by 1962. For future service benefits, employes would contribute 2½ per cent of earnings up to $3000 per year and 5 per

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SOFTER TIRE: P. W. Litchfield, chairman of Goodyear Tire & Rubber Co., compares a conventional 6.50-15 automobile tire with the company's new 7.60-15 super cushion tire, right, just announced. The new tire, indicated by W. E. Shively, Goodyear manager of tire design, carries 14 per cent lower air pressure than the tires it will replace

cent of earnings in excess of that amount.

The plan incorporated provisions for early retirement as well as benefits in case of total or partial disability incurred on the job. In effect, all employee contributions would be savings accounts, since each worker's contributions would be returnable, with interest compounded annually, in the event he leaves the company or dies.

Incidentally, in a summary of 188 retirement plans compiled by the Bankers Trust Co., New York, and correlated by the Association of Westinghouse Salaried Employes, East Pittsburgh, Pa., the pension for men retiring at 65 after 30 years' employment figures to well under the Ford proposal. STEEL is indebted to R. A. Hoy of the Pension & Retirement Plan Committee of the above Westinghouse group for statistics on these plans, as well as those of some other large manufacturers. An example is cited of retirement income accruing to a $250 a month General Electric employee after 30 years of service and attaining age 65—44.8 per cent of his base pay, or the equivalent of $112 per month, including primary social security benefits.

New Tire Introduced

Announcement by Goodyear Tire & Rubber Co. of its new passenger car tire, designated by the tradename "Super Cushion," is believed around the auto industry to presage an entirely new series of passenger car tire and wheel sizes which will gradually become standard on all new cars. Obviously, such a shift, the first major design change since 1931, will require the co-operation of the entire rubber industry. Goodyear happened to be the first to make public disclosure of the development.

The new tire operates on approximately 14 per cent lower air pressure than present tires. For example, the 6.00 x 16 size now takes 28 lbs. pressure. It will be replaced by a 6.70 x 15 size in the new design, which is inflated to 24 pounds pressure. In larger sizes, the decrease in pressure will range up to 6 lb. Wheel rim width on new automobiles engineered for the tires will increase an average from ½ to 1 in. The casing averaged ½-in. greater in cross section in smaller sizes and ¾-in. in larger sizes.

Claims made for the redesigned tire include better riding qualities, improved roadability, better resistance to bruising and cutting, lower tire temperature, less road vibration, easier steering, and particularly good absorption of lateral shocks. Goodyear has tested the casings for over a year in Akron and Texas under conditions of overload up to 25 percent for millions of miles and at speeds ranging up to 80 and even 100 mph.

Advent of the new tires on passenger cars should not be far off; in fact it is stated one manufacturer (unidentified) has decided to modify some of its models in midseason to make use of them. Their general adoption will mean a shift to 15-in. diameter wheels for all sizes of tires, requiring a fairly complete retooling on the part of wheel manufacturers to fabricate the smaller diameters with wider rims, as well as comprehensive changes in molds and tiremaking equipment by the rubber companies.

It is interesting to observe the evolution of tire sizes used on typical light cars which comprise over 60 per cent of all registrations, from 1916 to the present. In 1916, the 3-in. size with clincher rim was standard, 24-in. diameter, and tire inflated to 50 lb. pressure. Tire section width increased gradually over the years, to 3½, 4.40, 4.50, 4.75, 5.25, 5.50, 6.00 and now 6.70. Pressures decreased from 50 to 32 in the first balloon tires, then went up slightly to 35, then down to 32 and 28, and finally 24 in the forthcoming design.

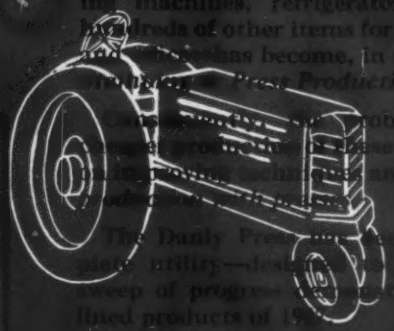
Car Prices Going Up

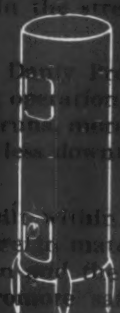
Increases in manufacturers' list prices of passenger cars were touched off generally by the boost announced by General Motors. Packard, Hudson, Nash, Kaiser-Frazer followed suit with raises in the range of $50-$100, and by the time this is printed there may be more. Exhaustion of inventories laid down at lower prices, together with the 11 per cent boost in labor costs, and the 12-43 per cent increase in materials costs, convinced cost control officials it would be impossible to absorb them on volume, particularly when steel shortages and labor unruliness put a curb on stepping up volume. Second-quarter earnings reports reflected the impact of higher costs, Chrysler, for example, showing a 33 per cent drop in earnings from the first quarter despite maintenance of production volume. Specifically, the Chrysler six-month statement listed earnings of somewhat over $36 million on output of 460,252 cars and trucks, or around $80 per unit.

Ford Models To Be Changed

In a surprising burst of publicity on forthcoming 1948 models, Ford Motor Co. officials are confirming trade reports that next year's Ford, Mercury and Lincoln passenger cars will mark the sharpest break from tradition in the company's history. E. R. Breech, executive vice president, said in Chicago the other day that the changeover is "probably the largest job ever undertaken in the automotive industry" and further that "we undertook to do this job in about half the time that any other company would normally take and we are doing it." Even so the new Ford triplets are not likely to see the light of day before January or February, with Mercury and Lincoln scheduled to precede the Ford.

MAKE 1947 PRODUCTS ON 1947 PRESSES





1947 Product manufacturers [illegible] washing machines, refrigerators, [illegible] hundreds of other items for the home, shop, store has become, in the main, *a matter of* [illegible] *Production.*

[illegible] problem of greater and [illegible] these items depends largely [illegible] and facilities for greater

The Danly Pr[illegible] designed for complete utility—designed to keep pace with the sweep of progress incorporated in the streamlined products of 19[illegible]

The machine tool accuracy of Danly Presses gives smoother performance, quiet operation and minimum wear—makes for faster runs, more accurate stampings, longer die life, less downtime and [illegible] production.

[illegible] guiding members bathe entire the cross [illegible] dust and other foreign material [illegible] enclosed construction [illegible] absence of outboard machinery promotes safety, makes for a neat appearance—especially in rows of [illegible]

A [illegible] Danly Air-Friction Clutch and a Circulating [illegible] oil spray lubrication system are featured in the Danly Press.

Investigate Danly's complete line of 1, 2 and 4 point single, and double [illegible] Straight-Side Presses, and Horning, Inclinable [illegible] Presses. They will pay [illegible] to become efficiently [illegible] your *production facilities* [illegible] your *product.*

MAKE 1947 PRODUCTS ON 1947 PRESSES

DANLY MACHINE SPECIALTIES, INC.

2100 South 52nd Avenue - Chicago 50, Illinois

1000-TON STRAIGHT-SIDE PRESS

This precision built 4-point Single Action Press has the clean lines, the completely enclosed construction that typify the Danly line. Readily accessible from all four sides, loading and unloading the press is not hampered by external supports or machinery. The bed is machined to receive air cushions.

DANLY ..THE PRESS FOR MODERN PRODUCTION

Taylor & Gaskin Acquires Indiana Bridge Company

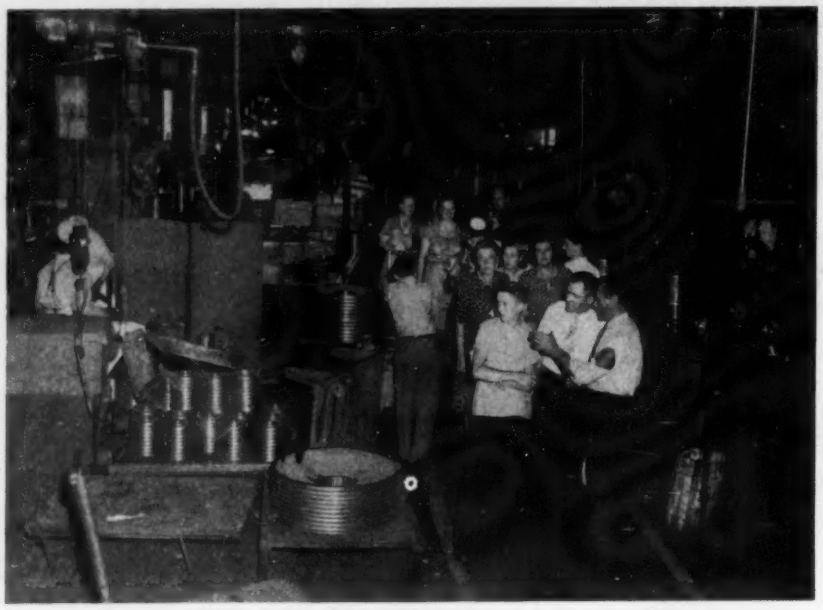
Detroit steel erecting firm gets 90 per cent of stock in Muncie, Ind., firm in business since 1887

TAYLOR & GASKIN INC., Detroit, steel erecting firm, has acquired 90 per cent of the stock in Indiana Bridge Co., Muncie, Ind., Mervvn G. Gaskin, president of the former company, has announced.

Present plans call for centralization of both firms' construction activities at Muncie, 50 per cent expansion in personnel, addition of new equipment and the production of a new product, a conveyor operating without sprockets or drive wheels.

Founded in 1887, the Indiana company has a rated capacity of 12,000 tons of structural steel and occupies 56,000 sq ft of space in its main manufacturing plant. County bridges were the first jobs it handled, but now industrial building makes up the bulk of its work in Indiana, Illinois, Kentucky, Michigan and Ohio.

No changes in name, policy or supervision will be made, Mr. Gaskin said. He will be president and treasurer of the firm, and his brother, N. J. Gaskin, has been named secretary and purchasing agent.



OPEN HOUSE: Employees of the Dodge Mfg. Corp., Mishawaka, Ind., entertained more than 4000 of their families and friends at an open house Aug. 4-6. Guests were served refreshments following a tour through the offices, foundry, machine shop, steel shop and other departments. A guide here is explaining one of the steps in the production of V-belt sheaves, parts of the Dodge line of power transmission equipment

Crucible Steel Awards $6 Million Contract to Koppers

Crucible Steel Co. of America, New York, has awarded Koppers Co. Inc., Pittsburgh, contract for construction of coke and byproducts facilities at its Midland, Pa., plant at a price in excess of $6 million.

A battery of 63 coke ovens, coal and coke handling equipment, byproduct facilities and a gas holder are included in the project. The new coke ovens will add 600 tons daily to the Midland output of blast furnace coke, bringing the total output to 1800 tons. The facilities are expected to be in operation by October, 1948.

As part of the general program, the present Crucible ammonia recovery system will be modernized by installation of two Koppers ammonium sulphate saturators and auxiliary equipment. The new coke ovens will be heated with blast furnace gas, and the blast furnace gas heating system will be extended to a battery of 21 ovens now under construction. Koppers will build at the site a 1 million cu ft gas holder for storing blast furnace gas.

Keystone Pays $279,018 In Profit-Sharing Plan

Checks totaling $279,018 have been sent to 1858 eligible employees of Keystone Steel & Wire Co., Peoria, Ill., under the company's profit-sharing plan for the fiscal year ended June 30, 1947. Employees who worked 50 weeks or more during the past fiscal year received $158.40, compared with $74.57 last year.

This, the largest amount ever distributed under the plan, compares with last year's share of $119,785 and brings the total accrued during the 11 years of the program to $1,034,051.

WAA Sells Old Ore Mine in Pennsylvania for $170,000

War Assets Administration has sold for $170,000 an iron mine and ore reduction plant near Scotia, Pa., which was developed and operated in the last century by Andrew Carnegie.

The property was purchased by Peter M. Chamberlain, Jacksonville, Tex. It had a total reported cost to the government of $753,229 and was leased and operated for a short time during the war by Butler Bros., St. Paul.

Andrew Carnegie developed the mine in 1883, but it was abandoned as unprofitable and had not been operated on a major scale since that date until World War II.

The new owner plans to use new operational methods. Large scale operation is not anticipated until 1948.

Great Lakes Carbon Buys Carolina Plant for $2 Million

Great Lakes Carbon Corp., Chicago, has purchased for $2 million the graphite electrodes plant at Morgantown, N. C., which was operated by National Carbon Co. during the war, War Assets Administration has announced.

The purchaser expects to lease the plant to National Carbon for production of special graphite for the Atomic Energy Commission. No commercial products will be produced.

Built at a cost of $6,681,870, the Morganton property occupies 44 acres on which are located 25 buildings.

Omaha Steel Works Gets Foundry Plant for $225,000

A surplus steel foundry in Omaha, Nebr., has been sold for $225,000 to Omaha Steel Works, Omaha, the wartime operator, War Assets Administration has announced.

The foundry has a capacity of 4000 tons of castings per year.

BRIEFS . . . .

Paragraph mentions of developments of interest and significance within the metalworking industry

War Assets Administration has sold a plant in Buffalo, used during the war for the manufacture of landing gear retractor assemblies, to Frank P. Gordon for $125,000. Containing 25,200 sq ft of floor area, the facility will be used for the manufacture of engine parts and pumps and contract machine work.

—o—

Engineering Foundation, New York, announces it is sponsoring a research project on gas behavior at the University of Pennsylvania, Philadelphia. The studies are under direction of Dr. John A. Goff, American Society of Mechanical Engineers.

—o—

War Assets Administration announces it is offering for sale or lease an oxygen plant at Pascagoula, Miss., which was operated during the war by Air Reduction Sales Co. Facility contains about 8600 sq ft of floor area.

—o—

U. S. Rubber Co., New York, has formed a sales department to handle farm tires and accessories. Lawler B. Reeves has been appointed manager.

—o—

War Assets Administration is offering for sale or lease a gasoline refinery near Catlettsburg, Ky., which was operated during the war by Ashland Oil & Refining Co. Property consists of 101 acres of land and contains a fully-equipped office, laboratory and other standard buildings. The operation is capable of producing 3800 barrels a day of 100 octane fuel.

—o—

Stewart Research Laboratory, Washington, announces that the third edition of its *National Paint Dictionary* will be ready for distribution on or about Sept. 1.

—o—

Wickes Boiler Co., Saginaw, Mich., manufacturer of marine and other type boilers, has purchased for $110,000 an engine lathe and boring lathe plant in Saginaw that was operated during the war by Wickes Bros., a company which has no connection with the buyer.

—o—

Eaton Mfg. Co., Cleveland, is transferring equipment at its Lawton, Mich., plant to its facility at Battle Creek, Mich., in a move to consolidate the Lawton and Battle Creek valve division activities. The Battle Creek plant was recently purchased from WAA. Eaton plans to sell the other factory.

—o—

War Assets Administration has sold the Moore Dry Dock Co., West Yard, Oakland, Calif., to Graham Industries Inc., Oakland, for $2,750,000. Graham plans to consolidate its activities at the West Yard. These include a lumber and housing business, machine shop operation, low-bed truck manufacture, wrought iron furniture manufacture, ship repair and shipbreaking.

—o—

National Cylinder Gas Co., Chicago, has purchased Independent Oxygen Co., Houston, Tex. National will consolidate its Houston branch with the new acquisition.

—o—

War Assets Administration will sell at fixed prices more than 1,750,000 pounds of iron and steel which cost the government $158,000. Items, which include squares, rounds, hexagons, billet rods, seamless tubing and a small quantity of copper bearing alloy flats, may be inspected at 4300 N. Pt. Washington Rd., Milwaukee.

—o—

Pennsylvania Railroad, Philadelphia, has opened an x-ray laboratory at Altoona, Pa., which embodies techniques for examination of steel, aluminum, brass and other metals used in rails, locomotives, cars and other equipment.

—o—

Wayne University, Detroit, is conducting an institute on packaging and material handling techniques Sept. 29 through Oct. 3.

—o—

Williams Management Engineering, Commerce Bldg., Milwaukee, has been formed to handle wage incentive plans, job evaluations, plant layout and production and cost controls, particularly in the foundry industry.

—o—

L. B. Foster Co., Pittsburgh, steel warehousing and distributing firm, has opened a warehouse and office in Houston, Tex., at 1016 Walker Ave. Jerome B. Strauss is manager.

—o—

United States Steel Corp., Pittsburgh, announces that in geographic distribution of its common stock New York ranks first with 2,037,845 shares, Pennsylvania second with 940,144 shares and Illinois third with 676,544 shares, as of June 30, 1947.

—o—

E. W. Bliss Co., Detroit, manufacturer of metalworking equipment, presses and dies, has announced that its sales office in Lansing, Mich., has been transferred to the Bliss plant in Hastings, Mich., from which point sales for the state, outside of the Detroit district, will be handled.

—o—

Reynolds Metals Co., Richmond, Va., has appointed Benjamin Wolff & Co., Chicago, as distributor for Reynolds' industrial aluminum products.

—o—

General Refractories Co., Philadelphia, announces that the new address for its San Francisco office is Sharon Bldg., 55 New Montgomery St.

—o—

Society of the Plastics Industry, New York, has just issued a 1947 directory, listing its entire company and individual membership which has risen 25 per cent in the past year.

—o—

Department of Commerce, Office of Technical Services, has issued an invitation to technical societies, trade associations and other private industry groups to assist it in evaluating an estimated 500,000 technical documents revealing details of Germany's wartime industrial technology.

—o—

Department of Commerce, Office of International Trade, announces that, as an aid to United States firms interested in establishing trade relations with German, Japanese and Korean firms, *Foreign Commerce Weekly,* publication of the department, will publish inquiries of companies in those occupied areas seeking trade contacts in the United States.

—o—

Ruslander & Sons Inc., Buffalo, manufacturer of kitchen equipment, has purchased Russell & Watson Inc., Buffalo, producer of hotel and restaurant equipment. The latter firm will be continued as Russell Watson Division of Ruslander. Personnel of both companies will be retained.

—o—

American Stove Co., Cleveland, last month started limited production of gas cooking equipment at its new plant at 3201 Harvard Ave., Cleveland, which it purchased in 1946. The facility was acquired and equipped with new machinery at a cost of more than $1 million.

—o—

Thomas Butlin & Co., Wellingborough, England, formerly a branch of the United Steel Companies Ltd., has been purchased by Morris Motors Ltd. to provide added foundry capacity for production of Morris tractors and other equipment.

—o—

Eutectic Welding Alloys Corp., New York, has opened a new plant and research center at 110 Duane St., New York. The facility has a capacity for turning out 90 special types of welding rods valued at $10 million annually.

The Business Trend

Drop in Auto Output Cuts Industrial Pace

DISRUPTIONS to production in the automobile industry had a sufficiently depressive effect on industrial activity to cut STEEL's industrial production index in the week ended Aug. 9 four points below the previous week. This put the index at 158 per cent of the 1936-1939 average.

The production drop in the auto industry was attributed to continuance of a strike in the plants of a supplier combined with hot weather which inspired many employees to remain away from work and reduced the productivity of others. Dropping to an estimated 79,199 passenger cars, trucks and busses, the auto industry's production in the week ended Aug. 9 was the lowest for this year with the exception of four other weeks.

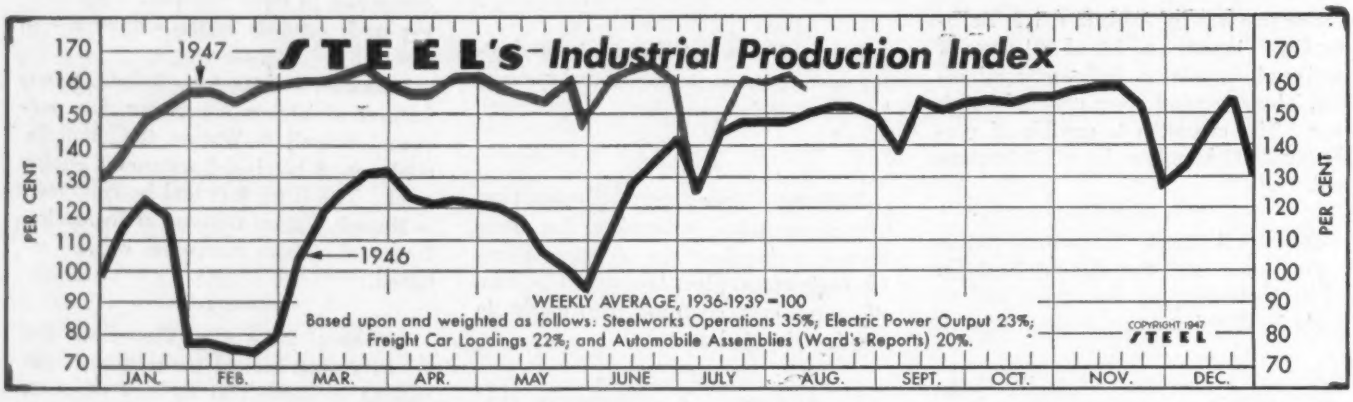
STEEL—Meanwhile, steel ingot production remained high and steady, at 95 per cent of capacity, and pressure for deliveries continues unrelaxed.

EXPORTS—A trend of foreign nations toward limiting purchases of commodities, particularly soft goods, to conserve their dollar balances suggests that some of the pressure of demand for goods produced in the United States may ease. Most recent example of such a move is Britain's "austerity" program to cut imports. Reflecting the trend of other countries to reduce imports, U. S. exports in June dropped 13 per cent below the postwar peak set in May. Reduced foreign demand for U. S. goods might hasten the arrival and intensification of a buyers' market in the United States, with an accompanying decline in price levels.

OUTLOOK—In fact, a transition from the strong sellers' market of the war and early postwar periods to a buyers' market is becoming increasingly evident, a survey just completed by the National Industrial Conference Board shows. Competitive influences are being brought into play, price increases are being strongly resisted, and substitute materials not measuring up to quality standards and specification changes tending to result in a somewhat inferior product are being rejected. While opinions as to the general outlook for business during the coming six months vary considerably, most businessmen, the NICB said, report increased conservatism and more cautious buying.

COAL—Third full week of operations under the new coal mine wage contract was marked by a continued decline in production. Output in the week ended Aug. 2 has been estimated at 11,540,000 net tons, compared with 11,800,000 tons in the week ended July 26 and 12,100,000 tons in the week ended July 19.

PRICES—Substantial price increases for steel products and some building materials were largely responsible, said the U. S. Bureau of Labor Statistics, for a rise of 0.5 per cent in its wholesale price average in the week ended Aug. 2 over that of the preceding week. This raised the index to a new postwar peak, 151.3 per cent of the 1926 average.



The Index (see chart above): Latest Week (preliminary) 158 Previous Week 162 Month Ago 149 Year Ago 150

FIGURES THIS WEEK

INDUSTRY	Latest Period*	Prior Week	Month Ago	Year Ago
Steel Ingot Output (per cent of capacity)†	95.0	95.0	86.0	89.0
Electric Power Distributed (million kilowatt hours)	4,874	4,806	4,531	4,412
Bituminous Coal Production (daily av.—1000 tons)	1,923	1,967	323	2,052
Petroleum Production (daily av.—1000 bbl.)	5,104	5,088	5,045	4,821
Construction Volume (ENR—Unit $1,000,000)	$109.8	$100.8	$78.7	$120.0
Automobile and Truck Output (Ward's—number units)	79,199	97,712	90,075	77,825

* Dates on request. † 1947 weekly capacity is 1,749,928 net tons. 1946 weekly capacity was 1,762,381 net tons.

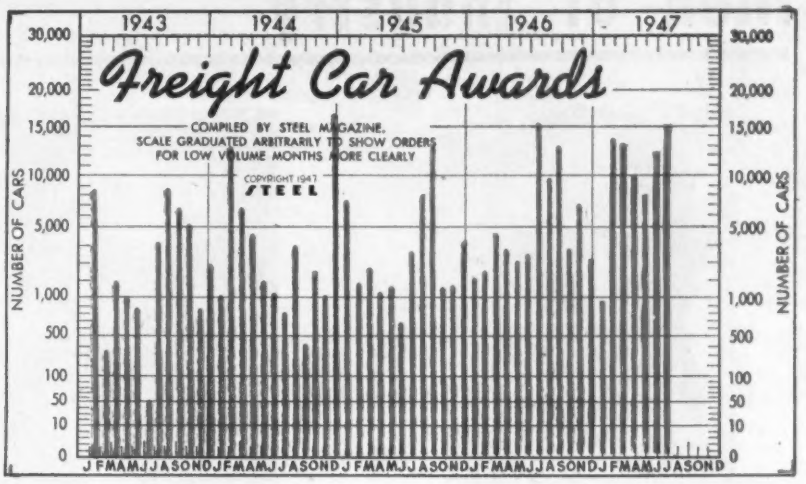
TRADE				
Freight Carloadings (unit—1000 cars)	920†	922	807	899
Business Failures (Dun & Bradstreet, number)	60	69	49	27
Money in Circulation (in millions of dollars)‡	$28,206	$28,129	$28,363	$28,326
Department Store Sales (change from like wk. a yr. ago)‡	+1%	+5%	+8%	+30%

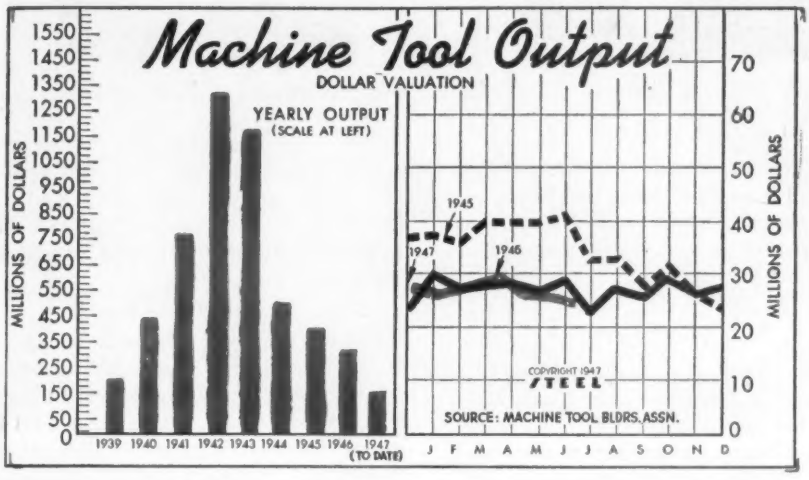
† Preliminary. ‡ Federal Reserve Board.

Freight Car Awards

	*1947	*1946	1945	1944	1943
Jan.	9,172	1,500	7,200	1,020	8,365
Feb.	13,727	2,403	1,750	13,240	350
Mar.	12,049	4,512	2,500	6,510	1,935
Apr.	8,836	3,764	1,120	4,519	1,000
May	7,390	3,023	1,526	1,952	870
June	11,585	3,335	670	1,150	50
July	14,865	14,836	3,500	795	4,190
Aug.	.....	9,629	7,240	3,900	8,747
Sept.	.....	12,768	12,840	400	6,820
Oct.	.....	3,407	1,320	2,425	5,258
Nov.	.....	6,707	1,650	1,065	870
Dec.	.....	3,041	4,116	16,245	2,919
Total	.....	68,927	45,432	53,221	41,374

* American Railway Car Institute.


Freight Car Awards
1943
1944
1945
1946
1947
COMPILED BY STEEL MAGAZINE.
SCALE GRADUATED ARBITRARILY TO SHOW ORDERS FOR LOW VOLUME MONTHS MORE CLEARLY
COPYRIGHT 1947 STEEL
NUMBER OF CARS
30,000
20,000
15,000
10,000
5,000
1,000
500
100
50
10
0
J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D



Machine Tool Shipments

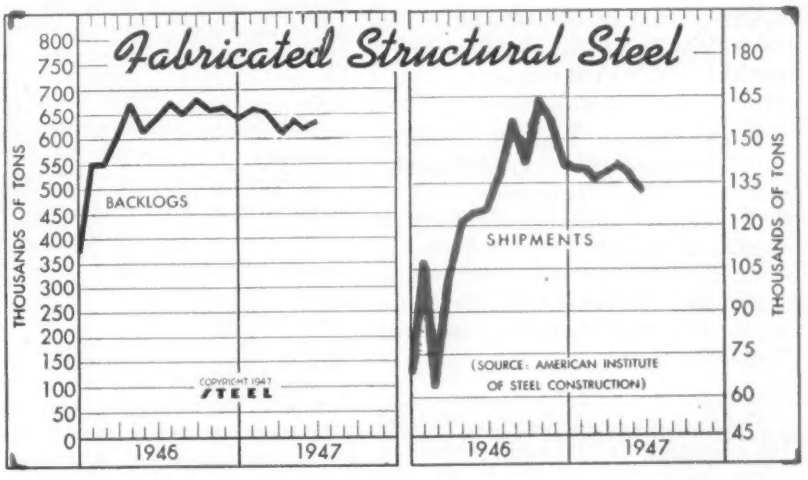
(000 omitted)

	1947	1946	1945	1944
Jan.	$26,542	$30,263	$37,353	$56,363
Feb.	26,765	26,949	36,018	50,138
Mar.	29,012	27,326	40,045	51,907
Apr.	26,857	28,108	40,170	41,370
May	25,791	26,580	39,825	41,819
June	24,720	28,580	41,040	41,471
July	.....	22,360	32,504	32,753
Aug.	.....	26,911	32,500	35,177
Sept.	.....	25,468	27,300	35,889
Oct.	.....	29,140	31,200	37,516
Nov.	.....	26,176	26,084	36,277
Dec.	.....	27,587	23,276	36,784
Total	.....	$325,448	$407,315	$497,464

Fabricated Structural Steel

(000 Tons)

	Shipments			Backlogs		
	1947	1946	1945	1947	1946	1945
Jan.	140.6	107.5	57.0	661	552	124
Feb.	136.1	63.8	49.0	656	551	152
Mar.	137.8	102.8	59.5	614	605	153
Apr.	141.4	122.5	62.8	632	674	163
May	136.5	124.4	72.6	628	615	166
June	133.0	126.8	69.2	634	642	195
July	....	140.2	69.9	...	674	194
Aug.	....	157.5	70.6	...	651	201
Sept.	....	141.9	63.4	...	682	248
Oct.	....	164.7	76.6	...	660	283
Nov.	....	157.3	78.0	...	665	305
Dec.	....	142.1	68.8	...	646	375
Total	....	1,551.6	797.4	...	...	...



FINANCE

	Latest Period*	Prior Week	Month Ago	Year Ago
Bank Clearings (Dun & Bradstreet—millions)	$12,042	$11,941	$10,911	$11,791
Federal Gross Debt (billions)	$259.4	$259.3	$258.2	$267.5
Bond Volume, NYSE (millions)	$14.6	$18.5	$18.2	$15.6
Stocks Sales, NYSE (thousands)	3,592	5,256	6,098	4,102
Loans and Investments (billions)†	$63.5	$63.5	$63.4	$60.7
United States Gov't. Obligations Held (millions)†	$39,154	$39,154	$38,990	$42,269

† Member banks, Federal Reserve System.

PRICES

STEEL's composite finished steel price average	$75.41	$75.41	$69.82	$64.45
All Commodities†	151.3	150.6	148.0	125.0
Industrial Raw Materials†	165.6	166.0	162.6	140.6
Manufactured Products†	146.0	145.0	142.8	120.6

† Bureau of Labor Statistics Index, 1926=100.

Men of Industry

J. G. GREEN

J. H. SMITH

WILLIAM U. TOWNSEND

J. G. Green has been appointed midwestern representative for the Baker Industrial Truck Division of Baker-Raulang Co., Cleveland. He will make his headquarters in Chicago. Mr. Green had been connected with the Westinghouse Electric & Mfg. Co., Pittsburgh, for 11 years. In 1935 he established the J. G. Green Co. in Pittsburgh, to provide engineering service and to act as manufacturers' agent, and later served as assistant sales manager of the Louis Allis Co., Milwaukee. For the past five years, he was assistant general manager of the Philco Storage Battery Division, Trenton, N. J., Philco Corp.

—o—

Alfred Marchev, formerly president and chairman of the board of Republic Aviation Corp., Farmingdale, L. I., N. Y., has been elected to the board of directors of Aircraft Screw Products Co. of Long Island City. Mr. Marchev also is president of Gordos Corp., and a director of General Precision Equipment Corp., New York.

—o—

The Packard Motor Car Co., Detroit, has announced the following promotions within its organization: **T. P. Thomas,** service technical manager since 1945, has been named marine service technical representative. **Norman A. Lull,** service merchandising manager, succeeds Mr. Thomas, and is, in turn, succeeded by **Byron R. Horsley,** formerly manager of the Service Parts Division.

—o—

J. K. Sutherland has been appointed sales manager of Benchmaster Mfg. Co., Los Angeles. For the past four years he has been with the Diamond Machine Tool Co., Los Angeles, as sales manager.

—o—

David W. Hopkins has been promoted to executive vice president of R-S Products Corp., Philadelphia. He has been associated with the corporation since 1939, and previous to his new position, was in charge of its Valve Division. Earlier in his career he served as consulting engineer and vice president of V. E. Montgomery Co., Cincinnati.

—o—

J. H. Smith, formerly assistant sales manager of General Cable Corp., New York, has joined General Electric X-Ray Corp., Chicago, as assistant to the president. Previous to his association with General Cable, Mr. Smith had been procurement manager of the Cramp Ship Building Co., Philadelphia.

—o—

Charles D. Mills has been appointed assistant to manager of operations, Pittsburgh district of U. S. Steel's Carnegie-Illinois Steel Corp. He has been associated with the corporation since 1919, and manager of Raw Materials, Fuel and Power Division, Pittsburgh District, since 1941.

—o—

E. A. Buxton has been elected chairman of the Committee on Steel Pipe Research, American Iron & Steel Institute. He succeeds **E. P. Corey,** who has retired after 52 years in the steel pipe industry. Mr. Corey has been general manager of tubular sales, Youngstown Sheet & Tube Co., Youngstown. Mr. Buxton is sales manager, pipe and tubes, Bethlehem Steel Co., Bethlehem, Pa. **Oscar I. Strickland,** manager of tubular sales, Wheeling Steel Corp., Wheeling, W. Va., has been elected vice chairman of the Committee on Steel Pipe Research.

—o—

B. C. Gamble has resigned as chairman of the board of Western Auto Supply Co., Kansas City, Mo. **Lester Hutchings** has been elected chairman of the board, to function as chief executive officer of the company. He has been with the company 20 years, serving as an officer and director since 1936, and president of the company since 1942. **Paul E. Connor,** vice president, has been elected to succeed Mr. Hutchings as president and general manager.

—o—

William U. Townsend has been named assistant manager of the Industrial Division of the National Gypsum Co., Buffalo. **Raymond W. Haugh** has been named manager of industrial lime sales; **Walter S. Hamme,** agricultural sales manager; and **David H. Shearer,** eastern district industrial sales manager of the division.

—o—

Henry C. Forster, formerly purchasing agent for Ekco Products Co., Chicago, has been appointed to the new post of merchandise manager for the company, and **John L. Moore,** formerly manager of the company's plant at Byesville, O., has been named purchasing agent.

—o—

John F. Scott has been appointed chemical and metallurgical sales representative of the New York district office, Globe Steel Tubes Co., Milwaukee. He joined the company in 1940 as metallurgist in the laboratories located at Milwaukee, and early in 1947 was transferred to the Milwaukee general sales office as chemical and metallurgical representative.

—o—

Harry L. Allen Jr. has been appointed assistant manager of the Buffalo district of Republic Steel Corp., Cleveland. He succeeds **John H. Graft,** who has been appointed manager of the Youngstown district. Mr. Allen formerly had been acting assistant district manager in Cleveland, as well as superintendent of open-hearth furnaces.

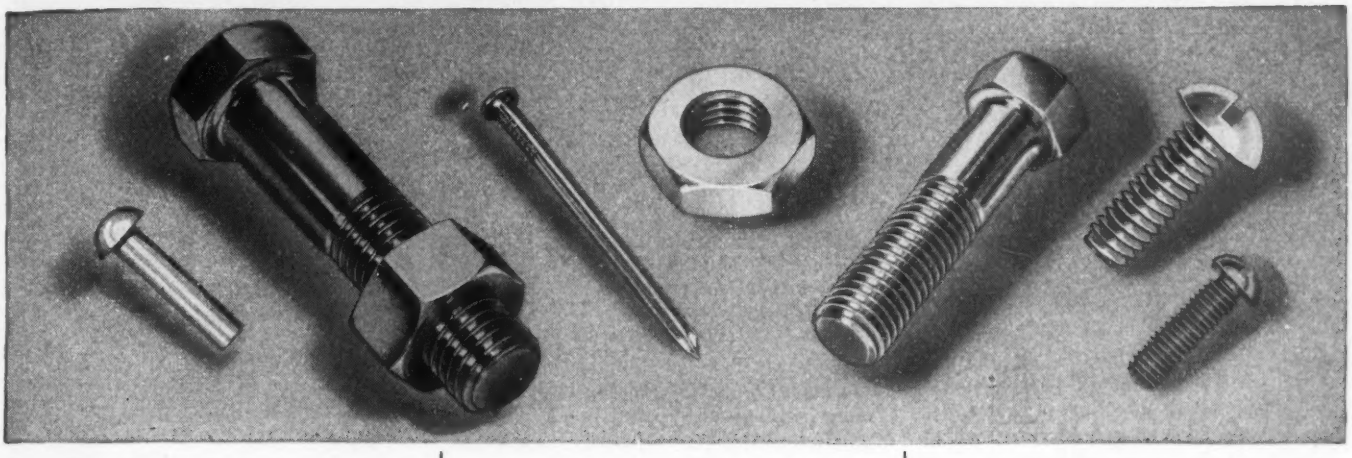
—o—

Charles J. Kolb has resigned as director of industrial relations, Colonial

HARPER fastening NEWS

REDUCE CORROSION LOSSES

with Non-Ferrous and Stainless Steel Fastenings



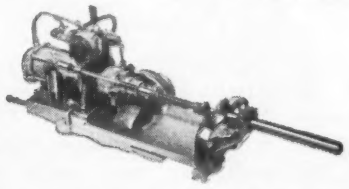
MONEL METAL BOLTS SIMPLIFY REPLACEMENTS

In butterfly valves ranging from small six inch diameters to huge 72 inch models for Utilities, Water Works and others requiring control of fluid systems, Harper Monel Metal bolts are used to fasten keeper segments which hold the rubber sealing seat in place. On occasion when the rubber needs replacement through wear the non-corrosive bolts are easily removed and reused on the new seat. Salt Water flowing through the system will not corrode these fastenings. Time, maintenance expense and breakdowns are thus eliminated.

Chain Operated Rubber Seat Butterfly Valve

FAVORITE DISH

Hamburger patties for the millions of American Hamburger fans are often handled and formed by machinery. A large manufacturer of such equipment specifies



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Radio Corp., Buffalo, effective September 1. He will be succeeded by **Howard S. Hagen,** personnel manager.

—o—

Harold S. Falk, president of the Falk Corp., Milwaukee, has been elected to the board of directors of Allis-Chalmers Mfg. Co., Milwaukee, to succeed his late uncle, **Herman Falk.** The new director has been actively associated with the Falk Corp. since 1906, and has been president of the firm since 1940.

—o—

Robert A. Weinhardt has joined Willys-Overland Motors Inc., Toledo, O., as automotive power plant engineer. He will be in charge of all Willys-Overland engine design, including a new six-cylinder engine which the company is planning to produce. He has been with Packard Motor Car Co., Detroit.

—o—

Marshall E. Neil has been appointed general sales manager of the Mid-States Equipment Corp., Chicago.

—o—

Charles T. Leigh, a vice president of Consolidated Vultee Aircraft Corp., San Diego, Calif., and **Ewart W. Goodwin,** Percy H. Goodwin Co., San Diego, have been appointed directors of Solar Aircraft Co., San Diego. **Joseph E. Padgett** has been appointed to serve as director of manufacturing at the San Diego plant of Solar Aircraft, and **Leon T. Noel,** to serve as budget director.

—o—

A. G. Westlund has been appointed manager, sales production co-ordination department of United States Rubber Co.'s Tire Division, New York. He has been manager of business development activities in New York for the U. S. Tire Division.

—o—

George H. Voelker has been appointed Latin American representative for the General Box Co., Chicago. He will supervise sales of the company to Central and South America and the West Indies. Mr. Voelker will retain his office in the New Orleans Division of the company, where he has been located for several years as sales manager of the division.

—o—

The American Car & Foundry Co., New York, has announced the following promotions in the Mine Car Sales Division: **Earl C. Riegel** has been promoted sales agent to succeed **R. A. Lockard,** retired; and **Karl R. Dietterick,** sales agent in the anthracite territory, to succeed **A. E. Smith,** also retired. They both will make their headquarters at the company plant at Berwick, Pa. The American Car & Foundry Co. also announces that **L. B. Chapman,** formerly connected with the Marine Division, has been appointed assistant manager, Valve Division, in the New York sales office, and that **H. P. Ackerman,** formerly assistant manager of sales promotion in the eastern states, has been appointed general sales representative of the Valve Division.

—o—

Frederick H. Eaton has been appointed assistant vice president of American Car & Foundry Export Co., New York. He had previously been connected with American Car & Foundry Co. as assistant to the vice president in the New York sales office.

—o—

B. A. Clements, vice chairman of the American Arch Co. Inc., New York, has resigned from the board of directors of the Harbison-Walker Refractories Co., Pittsburgh. He is succeeded by **Ralph S. Euler,** Mellon National Bank & Trust Co., Pittsburgh.

—o—

Morris F. Jacobs has been appointed representative in Wisconsin for Illinois Testing Laboratories Inc., Chicago. He will represent the complete line of Alnor instruments on an exclusive basis.

—o—

William C. Krecklow, Electrical Manufacturing Division superintendent of Allis-Chalmers Mfg. Co., Milwaukee, has been appointed production control manager of the company's West Allis general machinery works to succeed **Harold A. Wallace,** resigned. Mr. Krecklow is succeeded by **Arthur A. Ryan.**

—o—

The assignment of a new group of sales engineers to the branch and regional offices of the Brown Instrument Co., division of Minneapolis-Honeywell Regulator Co., Minneapolis, is as follows: **Edgar Andrews,** Atlanta; **Nilsson S. Bassett,** Boston; **R. J. Bierman** and **Clarence W. Swanson,** Minneapolis; **Edward J. Bryne,** Houston; **Warren H. Erftenbeck,** Buffalo; **David J. Fair,** Dallas; **William R. Hamaker,** Detroit; **Charles F. Hintz,** Chicago; **Lawrence W. King,** New York; **Donald W. Larcen,** Milwaukee; **John F. Smith,** Tulsa, Okla.; and **Andrew H. Albee,** Cleveland.

—o—

Three shifts in the sales organization of the Mechanical Goods Division, Goodyear Tire & Rubber Co., Akron, include: **R. E. Pauley,** district manager at Pittsburgh, has been named sales manager of the company's molded goods plant at St. Marys, O. He is succeeded by **Robert B. Warren,** who has been eastern railroad sales manager for Goodyear in New York. **Howard T. Martin** has been named district manager of mechanical goods sales at Dallas, Tex. At St. Marys, Mr. Pauley succeeds **Samuel DePree,** recently appointed an assistant manager of the company's Mechanical Goods Division, with headquarters in Akron. Mr. Martin succeeds **O. A. Schilling,** recently appointed eastern sales manager of the company's mechanical goods, with headquarters in Akron.

RANDOLPH W. HYDE

Has been elected treasurer of Carnegie-Illinois Steel Corp., Pittsburgh, subsidiary of U.S. Steel Corp. Noted in STEEL, August 11 issue, p. 72

—o—

Robert G. Schulte has been named zone manager in St. Louis for Chevrolet Motor Division of General Motors Corp., and **Marvin Hoffman,** Omaha, Nebr., zone manager for the division.

—o—

The Research & Development Division of Pittsburgh Consolidation Coal Co., Pittsburgh, has announced the appointment of **Dr. D. Leigh Fowler** as manager of its patent department. He has been associated with Corning Glass Works, Corning, N. Y., in a similar capacity. **Gerard C. Gambs** has been appointed manager of the service department of the Research & Development Division, and will also serve as a coal mining engineering consultant to the projects of the division.

—o—

Charles Stanton has been appointed district field engineer in the Philadelphia office of Chain Belt Co., Milwaukee. He formerly held a similar position in the company's Detroit office.

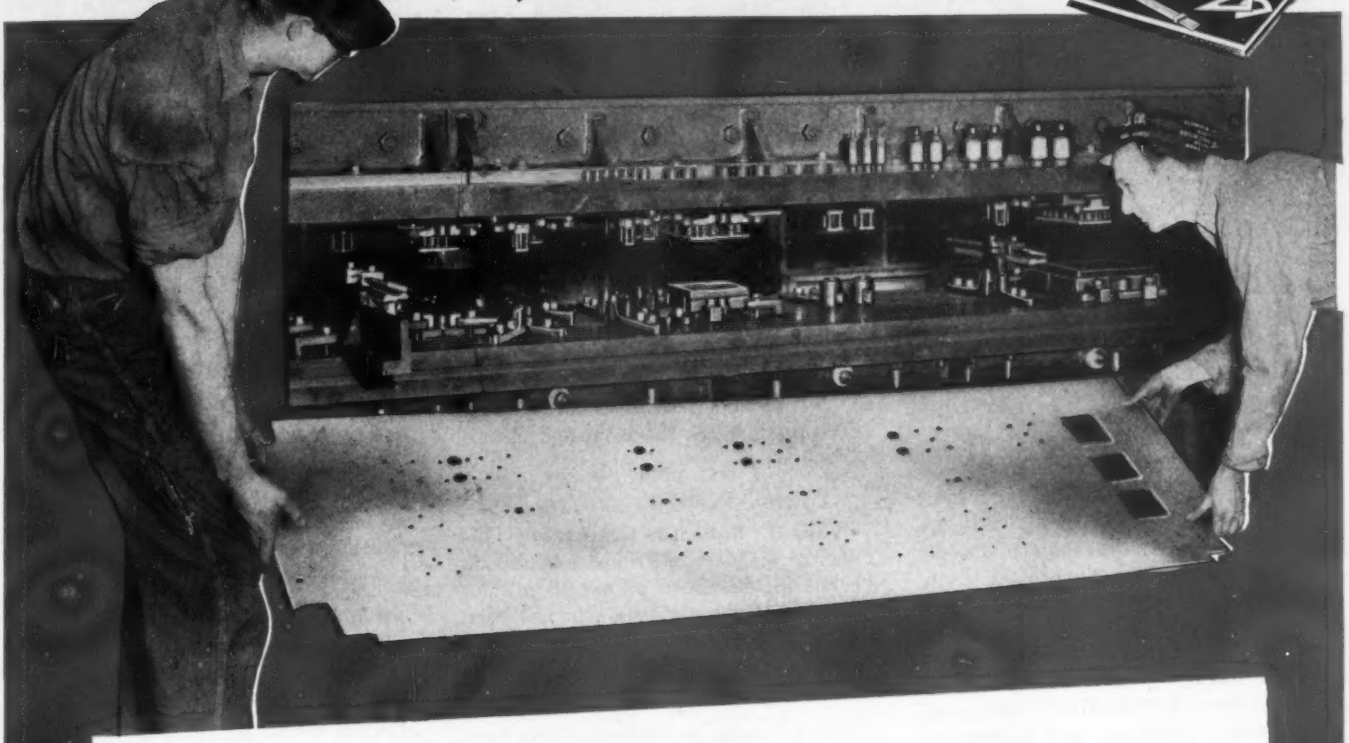
—o—

Walter J. Clarke has been engaged by the James Flett Organization Inc., Chicago, as assistant manager of the ferrous and nonferrous metals and surplus materials department. He will have headquarters in the company's home office in Chicago. Mr. Clarke had been connected with M. Cohen & Sons Co., Cleveland, and during the war he was chief of the scrap and surplus material disposal branch of the Army Air Forces at Wright Field, Dayton, O.

—o—

Charles I. Crais has been appointed

Meet sudden change-orders without tying up Press Production



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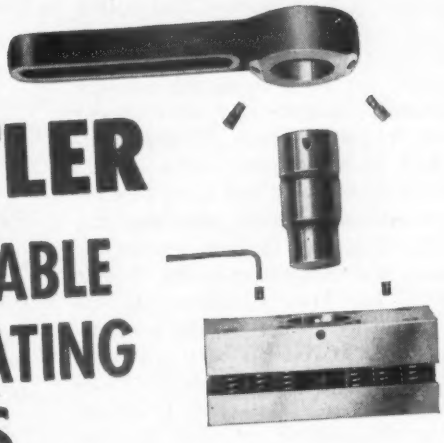
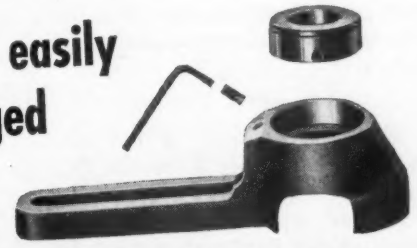
ADJUSTABLE PERFORATING DIES
quickly and easily rearranged





Change-orders from the engineering department usually cause plenty of headaches in production... particularly where die piercing operations are involved.

But... if you're using Whistler Adjustable Dies, there is no lost time —no waiting—no extra die expense. The same dies are easy to rearrange to the new design. Add units from stock, or delete sizes and shapes no longer required. Arrange the new set-up right on the press.

Consider the savings in production time alone. Then think how continued re-use of the same dies in subsequent jobs writes off first cost.

Whistler Dies can be used in practically any press. All parts are interchangeable. Precision is assured on long or short runs. Closer centers permit fewer press operations.

Deliveries are quick... little or no waiting. Standard round punches and dies up to 3″ are available from stock. Ovals, squares, rectangles and special shapes can be made up in a few days. Write for the Whistler Catalogs today and get all the facts.

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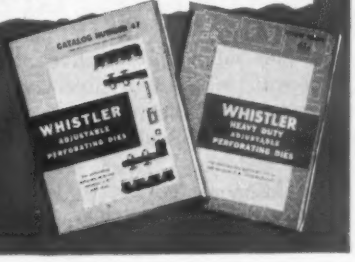


S. B. WHISTLER & SONS, INC.

754 MILITARY ROAD BUFFALO 17, NEW YORK

sales representative in the states of Alabama, Arkansas, Louisiana and Mississippi for Lukens Steel Co., Coatesville, Pa., and its divisions, By-Products Steel Corp. and Lukenweld Inc. He will have headquarters at New Orleans.

—o—

Liquid Conditioning Corp., Linden, N. J., announces the appointment of **M. J. Rahiya** as its engineering sales and service representative in Louisville.

—o—

Austin W. Clark has been named treasurer and controller of the Carborundum Co., Niagara Falls, N. Y. He formerly had been controller of the Special Ordnance Division of the Blaw-Knox Co., at York, Pa.

—o—

W. L. Barbon, formerly Chicago district manager of the Fisk Tire Division of United States Rubber Co., New York, has rejoined the company as district manager at Baltimore.

—o—

E. B. Cleborne, vice president and director of Allegheny Ludlum Steel Corp., Pittsburgh, has been elected executive vice president of the corporation, to assume his new duties September 1. Prior to the merging of Allegheny Steel and Ludlum Steel in 1938, Mr. Cleborne had been a vice president and director of Ludlum Steel Co. He is also president of Wallingford Steel Co., Wallingford, Conn., a subsidiary company of Allegheny Ludlum, and will continue in that position.

—o—

The Monroe Auto Equipment Co., Monroe, Mich., has announced the appointment of **George Miller** as assistant sales manager in charge of truck and tractor seat sales in the expanded After Market Division, and the appointment of **Charles A. Zanes, George H. Sheehan, Alan F. Cannon** and **Jack Eddy** as regional sales supervisors. For a period of 25 years Mr. Miller had been associated with the Chrysler Division of the Chrysler Corp., Detroit, and during the past year had been sales manager of the Super Six Mfg. Co., Minneapolis. Mr. Zanes will be active in the territory handled by the company's manufacturers' sales representatives, Hanser Automotive Products Co., and L. M. Hirsig Co. Inc., covering states on and adjacent to the eastern seaboard. Mr. Sheehan will cover the south central west territory, working with the Edwards-Dennis Co., Kansas City, and Connell-Roper-Harvey Co., Dallas, Tex., manufacturers sales representatives. Mr. Cannon will make his headquarters in Chicago, and will operate in the territories of the Illinois Auto Electric Co., Chicago, and the Glen T. Lees organization, Minneapolis. Mr. Eddy will cover the several territories in the 11 farthest western states, co-operating with Walter Weber Co., Los Angeles; Automotive Warehouse Inc., Portland, Oreg.; Central Supply Co., Denver; Robert B. Grant, Montana; and M. L. Cohn, New Mexico.

—o—

Frederick Baker, treasurer, Blaw-Knox Co., Pittsburgh, and of Blaw-Knox International Corp., has been appointed a member of the Foreign Commerce Department Committee of the United States Chamber of Commerce.

—o—

Paul E. Sprague, vice president, Glidden Co., Cleveland, has been appointed assistant to the president. **John P. Ruth,** a director of the company and general manager of the Chemical & Pigment Division, has been elected a vice president. **Ralph G. Golseth,** formerly assistant vice president, has also been elected a vice president of the paint and chemical company.

—o—

Willis J. Bruninga, district sales director of the Keystone Steel & Wire Co., Peoria, Ill., has been promoted to manager, building trade sales. He has been with the organization for the past 18 years.

—o—

The following appointments have been announced by the Colorado Fuel & Iron Corp., Denver: **Howard J. Davis,** formerly assistant manager of wire product sales, has been appointed manager of product research and development for the Colorado Division. **Floyd E. Watson** has been promoted from district sales manager of the Salt Lake City office to manager of sales, wire products, for the Colorado Division. **James N. Counter,** district manager of the Phoenix territory, has been transferred to the Salt Lake City territory in the same capacity. **Cliff Martin** has been appointed district sales representative in the Phoenix territory. In Texas, **Lou J. Renner** has been appointed manager of wire rope sales, and **Luke Helms** appointed assistant manager of wire rope sales, but will have his headquarters office in Denver.

—o—

E. S. Cramer, recently of the sales engineering department of Norton Co., Worcester, Mass., has been appointed by the company as abrasive engineer for a section of the Pittsburgh district. He succeeds **L. W. Grubbs,** who has resigned to enter the field of consulting mechanical engineering.

—o—

Roy L. Leventry has retired as manager of the Youngstown district of Republic Steel Corp., Youngstown, but will remain with the company as a consultant, maintaining offices in Youngstown. He is succeeded as manager by **J. H. Graft,** who has been assistant district manager in Buffalo district.

—o—

William O. Lovejoy has been appointed as a representative in the Florida district for Liquid Conditioning Corp., New York.

—o—

L. J. Kinder has been named factory manager, Indian Motocycle Co., Springfield, Mass. He has been previously associated with Fairchild Aircraft, Burlington, N. C.

—o—

Howard E. Carson has been appointed manager of the business management and research department of Kaiser-Frazer Corp., Willow Run, Mich. He had been assistant department manager.

—o—

P. R. Wilson has been named sales division manager of the Atlantic Division of American Can Co., New York, succeeding **D. B. Craver,** who has been transferred to the Central Division.

—o—

William R. Northlich has resigned as merchandising manager and director of advertising, Owens-Corning Fiberglas Corp., Toledo, O., to become director of client service for Roy S. Durstine Inc., Cincinnati advertising agency.

—o—

Jack F. Knobloch, general superintendent of the Weatherhead Co., Cleveland, since 1941, has joined the Jack & Heintz Precision Industries Inc., Cleveland, as superintendent of the Ball Bearing Division.

—o—

H. E. Angier, associated with the Conlon Corp., Chicago, since 1933, has been named comptroller of the successor concern, the Conlon-Moore Corp., manufacturing household washers, ironers and

J. PAUL AHLBRANDT
Appointed to newly created post of director of manufacturing, Hamilton Mfg. Co., Two Rivers, Wis. Noted in STEEL, August 11 issue, p. 74

B. C. GOULD

Elected executive vice president, Murray Corp. of America, Detroit. Noted in STEEL, August 11 issue, p. 76

FRANK U. HAYES

Has been appointed sales manager of Bullard Co., Bridgeport, Conn. Noted in STEEL, July 21 issue, p. 92

R. L. PUETTE

Elected vice president in charge of production, Clark Controller Co., Cleveland. Noted in STEEL, August 11 issue, p. 72

heating and cooking appliances. He continues his duties as assistant secretary and treasurer of the concern.

—o—

V. E. Bertramson and **O. S. Williamson** have been appointed sales representatives for Minnesota and North Dakota by Titan Mfg. Co., Bellefonte, Pa.

—o—

C. W. LaPierre, formerly associated with General Electric Corp., Schenectady, N. Y., has joined the American Machine & Foundry Co., New York, as vice president in charge of engineering. **H. L. Newell** has been appointed manager of the central engineering department of the company, and will maintain headquarters in Brooklyn, N. Y.

OBITUARIES

Fred P. Voss, 88, president of the Voss Bros. Mfg. Co., Davenport, Iowa, died recently. Mr. Voss, with his late brothers, John A. and William H. Voss, organized the company in 1876. Mr. Voss also was one of the organizers of the Blackhawk Foundry Co., Davenport.

—o—

Frederick W. Willard, 66, former president, Nassau Smelting & Refining Co., Tottenville, Staten Island, a subsidiary of the Western Electric Co., died at his home in Summit, N. J., Aug. 11. He had been with the Bell system for 41 years when he retired in April. Mr. Willard joined Nassau as vice president and a director in 1931, when it was acquired by Western Electric. He had been elected president in 1937.

—o—

Earl J. Sherwood, 49, president of the Great Lakes Concrete Pipe Co., Buffalo, died August 12. He had been district manager in Buffalo for the American Construction Co., marine contractors, from 1927 to 1929.

—o—

Clarence H. Mosher, 74, former western New York sales representative of the Moeller Instrument Co., Richmond Hill, N. Y., and the J. E. Lonergan Co., Philadelphia, died Aug. 9.

—o—

Lester O. Stearns, 53, president, Stearns Supply Co., Cleveland, died Aug. 1 in York, Pa. Before establishing his own mill supply and small tool business in 1943, he had been local sales manager for American Radiator Co., and had been connected with Columbia Radiator Co. in Pennsylvania. At the time of his death he was also domestic sales manage for York-Shipley Co., York.

—o—

Andrew A. Kramer, 82, founder and president of the Columbian Steel Tank Co., Kansas City, Mo., died recently at his home in that city. He was also president of the Steel Mfg. & Warehouse Co., and owner of the Kansas City Barrel & Package Co., both of Kansas City.

—o—

Paul W. Gabaelein, 60, vice president and operating manager of Chrysler Motors of California, died in Pasadena, Calif., recently. He had been with the Chrysler Corp. for 17 years.

—o—

Wallace R. Campbell, 65, chairman of the board of the Ford Motor Co. of Canada, died at his home in Windsor, Ont., Aug. 10, after an extended illness. Former president of the company, he retired as active head in 1946.

—o—

William P. Casey, 56, president of the Casey Mfg. Co., Oshkosh, Wis., died recently after an extended illness.

—o—

Henry M. Reed, 66, chairman of the board of the American Radiator & Standard Sanitary Corp., New York, died in Pittsburgh Aug. 12.

—o—

Asa B. Clark, 67, general traffic manager, Union Carbide & Carbon Corp., New York, for 25 years until his retirement in 1941, died recently after a short illness.

—o—

Joseph Hoffmeyer, 39, a supervisor for Anaconda Wire & Cable Co., Hastings on Hudson, N. Y., died recently.

—o—

George A. Taylor, 73, formerly assistant to the president of the Bishop & Babcock Mfg. Co., Cleveland, died Aug. 11.

—o—

Harry M. Evans, 76, former president of the Franklin Supply Co. Inc., New York, died at his home in Lyons, N. Y., Aug. 2. Mr. Evans had been with the company from 1908 until his retirement in 1946.

—o—

Powell Pardee, 64, New York representative of the Inland Steel Co., Chicago, died of a cerebral hemorrhage Aug. 9 in his suite in the Ritz Tower Hotel. Associated with the company 42 years, Mr. Pardee for a long period headed the order department in Chicago.

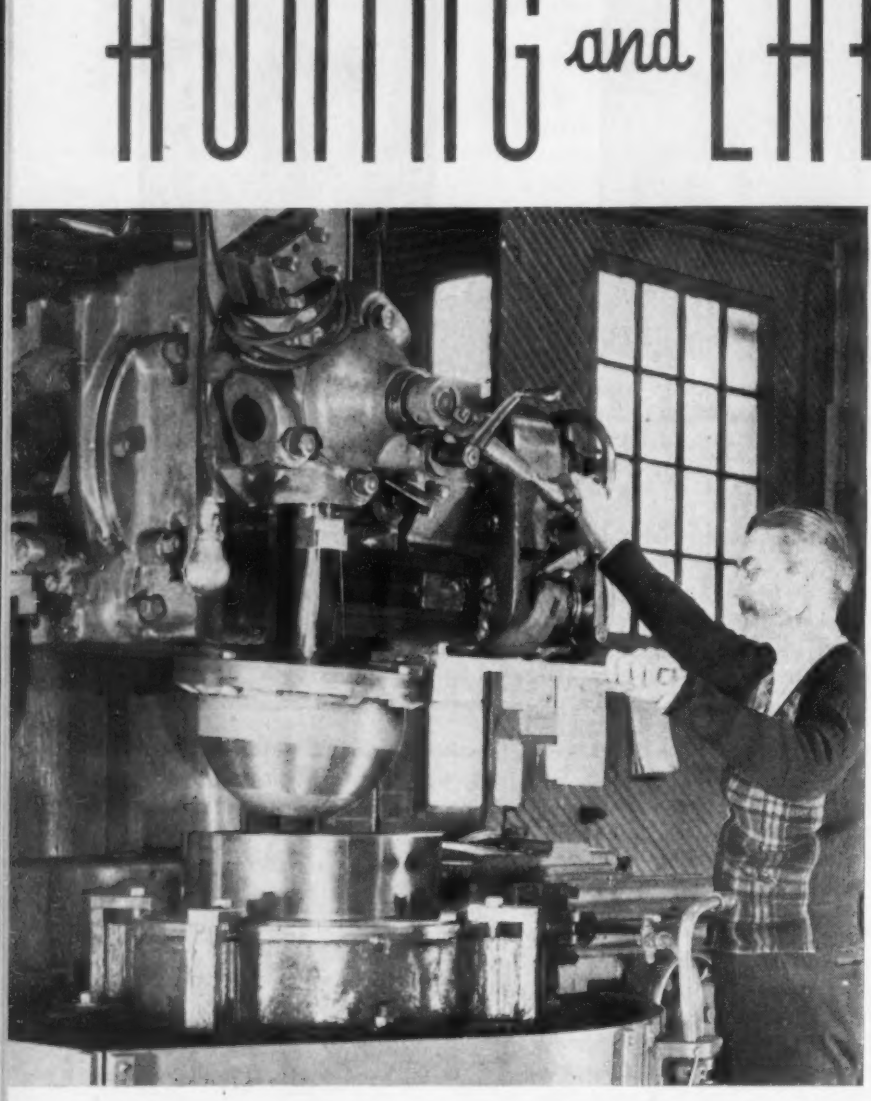
—o—

Frank V. Sackett, 73, manager of the department of supervisors of the Grinnell Co., New York, died recently at his home in Yonkers, N. Y.

—o—

Eugene H. Haug, 53, consulting engineer for the Modern Control Co., Glencoe, Ill., died in that city Aug. 9. He had formerly been connected with the Wisconsin Bridge & Iron Works, and Chain Belt Co., Milwaukee.

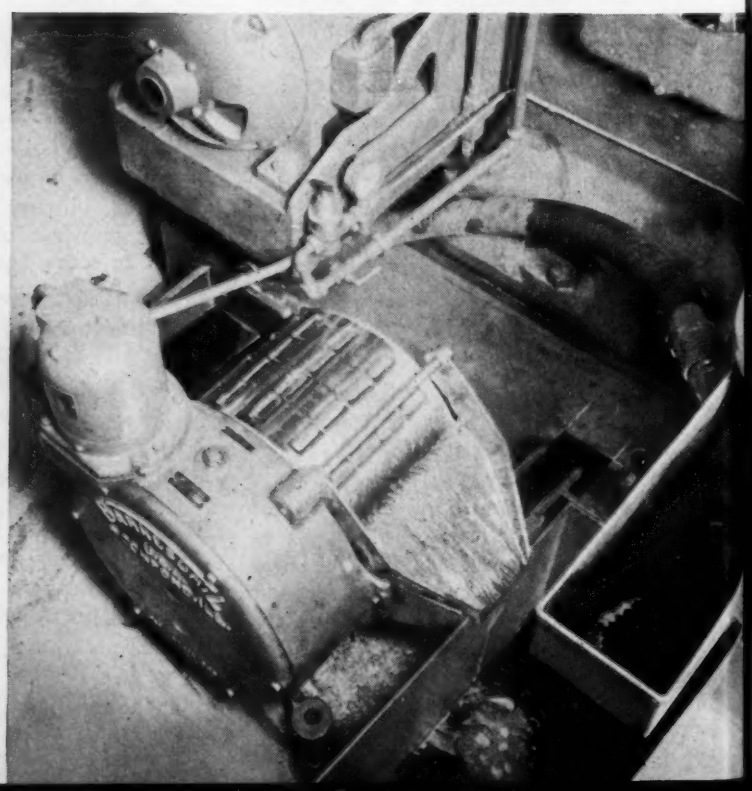
HONING and LAPPING...



Part Eleven, and the Final Installment of this Series on the History, Development and Significance of Basic Techniques in Metalworking. This Article Deals with Methods for Removing Minute Layers of Metal in Precision Sizing and Finishing by

MODERN MACHINE TOOLS

By GUY HUBBARD
Machine Tool Editor, STEEL



SHOPMEN have a number of terms in which two subjects almost invariably are mentioned together—as are "ham-and-eggs" and also "corned beef-and-cabbage". Among those compound shop terms are "jigs-and-fixtures", "punches-and-dies" and "honing-and-lapping". Because of the constant association of two subjects in what have grown to be in effect compound words, there is considerable confusion in the minds of many people as to the individual significance of the words. That I find is true particularly of "honing-and-lapping".

Actually, "honing" and "lapping" are two separate and distinct metalworking techniques—just as separate and distinct as are boring and reaming, or planing and scraping. It is true that both are in the nature of final operations. It is true that both are in the realm of abrasive machining. Also, it is true that in some cases—but by no means in all cases—lapping follows honing. However, there is considerable difference between these two methods of machining (and I say "machining" deliberately); and the cutting tools and the machine tools involved are quite different.

Quite properly, each of these machining methods has its staunch advocates—including a number of leading abrasives experts, tool engineers, machine tool builders, production engineers and even metallurgists, who have delved deeply into the fundamentals of "machining to microinches".

For example, David A. Wallace, president, Chrysler Division, Chrysler Corp., John O. Almen of the research laboratories of General Motors Corp., and scientists with such organizations as the Brush Development Co. and Physicists Research Co., have done and are doing work in this field which is of great importance not only to the automotive and aviation industries, but to all machine building industries. This work is of great public importance because of its effect in improving performance and lengthening the useful life of mechanisms without adding to their cost.

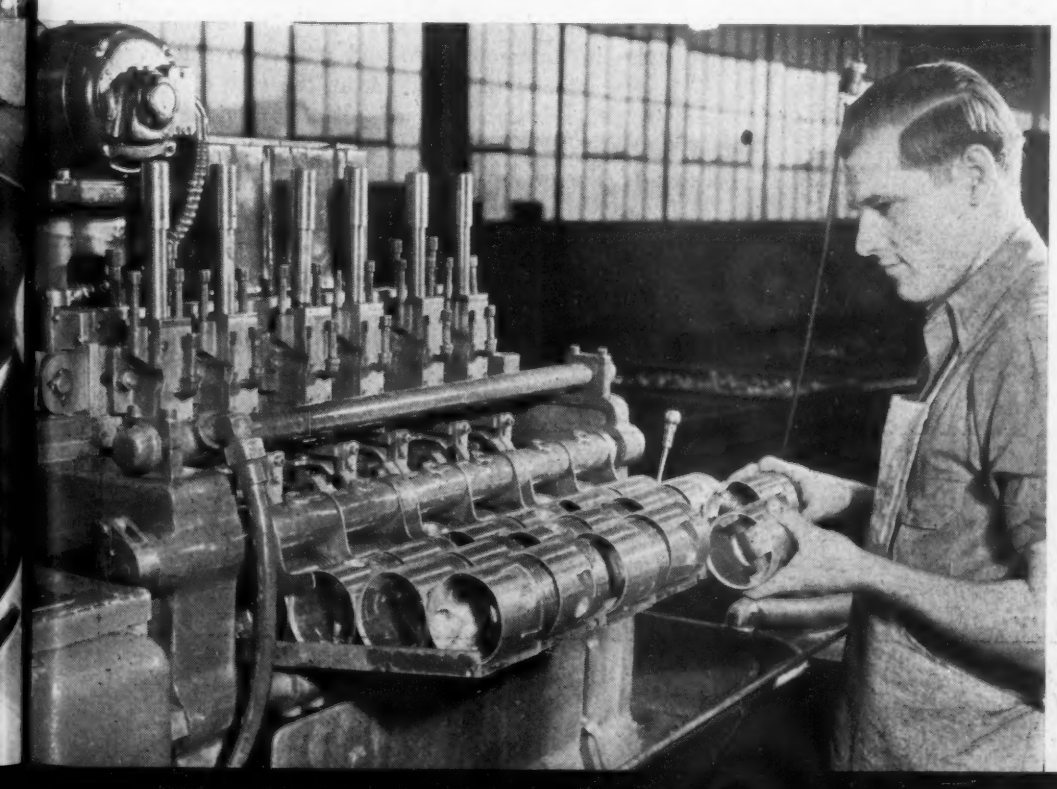
Having brought up the matter of confusion of terms, let us attempt now to get squared away on the relative meaning of "honing" and "lapping". Honing is a word of ancient origin denoting the final abrasive sharpening of tools by means of fine grain "whetstones" and oil stones. We all have seen barbers honing razors in their spare moments between shaves.

Most of us too, are familiar with the small pocket hones or oilstones which the toolmaker produces from his shop coat at the slightest provocation, to touch up a cutting tool, to break the corners of a small machined part, or to "remove the whiskers" from the surface of a finished piece of work. I for one often am shocked at the latter operation on a part of gage block quality, but my toolmaker friends undoubtedly know what they are doing.

Mechanized honing, as carried out as a true production operation in machines built by several leading machine tool builders, can be described as the application of power-driven whetstones and oilstones (honing sticks) to the sizing and smoothing of surfaces both internal and external. In other words, it is the 20th century mechanized application of the prehistoric abrasive "rubbing block", one of the earliest tools employed by mankind. It is a peculiar fact that some of the most highly developed metalworking processes of our day and age are so closely related to processes used by primitive man—who in turn learned them from nature.

Mechanized honing originally was applied as an internal finishing method for cylinders, to remove the whiskers and high spots left by previous machining. Machines resembling drill presses commonly are used—in fact the earlier honing operations probably were carried out in converted drill presses. This practice I believe grew out of the old-time technique of "leading out" pistol barrels and gun barrels after drilling and rifling, although the actual tool—lead plug cast into the barrel and charged with emery—was a "lap" rather than a hone.

In 1920, in the plant of one of the leading revolver manufacturers, I came across three "barrel polishing machines" built by the Robbins & Lawrence Co. in 1850 and still in active use 70 years afterward. These vertical machines had a slide carrying three tools which was reciprocated up and down by a connecting rod and adjustable throw crank on a flywheel at the top of the machine. The tools revolved with the twist of the rifling. These machines were more than "reasonable facsimiles" to some of the modern mechanically operated vertical honing ma-



Upper left—Method of lapping together members of a big ball-and-socket joint. Photo courtesy Aetna Standard Engrg. Co.

Far left—Micromatic Hydrohoner with Microsize control setup for two at a time finishing of bores in precision gears

Center—Barnsdril magnetic separator mounted on honing machine to remove ferrous particles from the circulating coolant

Near left — Superfinishing Chrysler pistons six at a time in automatic machine with horizontally oscillating stone carriers

This inspector in the Chrysler plant is using a No. 1 Profilometer in routine checking of surface quality of Superfinished bearing surfaces of crankshaft from which all "amorphous" metal has been removed in the finishing process

chines—although as just mentioned, their tools were laps rather than hones.

The real "heart" of the modern honing machine, regardless whether it be horizontal or vertical, mechanical or hydraulic, is the honing head, carrying and controlling the honing sticks or "stones" as they usually are called. Ordinary practice is to use four stones in tools for hones less than 3 in. in diameter and four or six stones for larger work. The stones are carried in metal holders which in turn are held in true relative position on what is known as the shoe of the tool. The assembly is something like that of an expanding reaming tool, in that the shoes are solidly supported on a central and adjustable cone or cones. A heavy helical spring ordinarily is included in the expanding mechanism to give the stones uniform pressure against the surface on which they work.

It has been pointed out by several machine shop authorities that the modern honing tool is to all intents and purposes a segmental grinding wheel of adjustable diameter which operates through a combination of reciprocation and revolution, so co-ordinated that it cuts criss-cross instead of tracking. Various methods of expanding the hones are employed, including rachets, spool-and-finger devices, brakes and hydraulic systems. Extremely close setting is made possible by micrometer collars.

The illustration at the lower left hand corner of the first page of this article shows a setup for honing bores of precision gears in a Micromatic Hydrohoner with microsize control. The turret fixture has chucks which grip and locate the gears on their pitch lines. The operator loads two at the front while the dual honing tools operate on two at the rear. Note the control panel at the front.

During a recent visit to the Micromatic Hone Corp. in Detroit, Kirke W. Conner, president of that company, showed me a remarkable setup by which all cylinder holes in six-cylinder engine blocks are finished to limits of plus-or-minus 0.0005-in. Roundness and straightness both are corrected, the whole job requiring only 30 sec. With this system there is no need for selective fitting of pistons.

The machine which was demonstrated to me was built by Barnes Drill Co., Rockford and was equipped with a Micromatic head. Blocks rolled in on a conveyor and were locked in place by an automatic fixture. When a button was pressed, the "hydrosize" hones went into action. As each one brought its respective bore to exact size, as measured by an air gage built into it, pressure on its stones was released so that no more metal was removed.

When the last one thus "checked in", the head withdrew the hones and the machine stopped—ready for repetition of the cycle. This is a prime example of "measurement keeping pace with production" by actual linking together of the machining and measuring functions. Abrasive machining has been and is right up in the forefront in this sort of thing.

It should be mentioned that in this instance honing removes about 0.004-in. of metal from each of the bores in correcting out-of-round and taper conditions left by previous machining. As I have said before, honing is a true "machining" process—not one which simply "slicks up" surfaces. Compensation for wear of the stones is done automatically in this setup. I might add that several years ago, in the same plant, I saw huge hones—at least 30 in. in diameter as I recall them—being made for a secret purpose. That purpose, it now can be revealed, was the finishing of cylinders for boosting heavy bombers off the decks of aircraft carriers, as in the case of the famous Tokyo raid.

Starting off with not more than five or six grits, grades and lengths of stones, the honing stick business now has developed into real "big business" involving several hundred styles in numerous grits and grades to suit every variety of work and material. As in the case of regular grinding, artificial abrasives and scientific bonding make modern honing—including time-cycle methods—possible because of the uniformity of grains and bond. Speeds vary from 185 revolutions per minute and 45 ft per min traverse on work under 2¼ in. diameter, to 65 revolutions per minute at 20 ft per min traverse on work 7 to 10 in. in diameter.

Like broaching, honing "took hold" originally on internal work—in which it now is (*Please turn to Page* 120)

In this series, the author started with "Turning" — a process by which considerable quantities of metal often are removed. Now he winds up with "Honing and Lapping"—methods by which minute quantities of metal are removed. Don't underestimate the importance of the latter techniques. "Machining to microinches" will represent one of the greatest fields for profitable exploration during the Big Machine Tool Show.

AIR TOOLS Speed Manufacture of Automobile Bodies

AUTOMOTIVE assembly lines are kept moving at a pace based upon efficiency, much of which is derived from time savings in individual operations throughout the plant by the use of compressed air tools. This is found to be true in the Nash body plant of Nash-Kelvinator Corp. in Milwaukee, in which only bodies are produced.

Unlike other automotive plants, in which machine tool operations predominate, very little machine work is done in the body plant. In Nash's case nearly all car body panels are formed in presses ranging up to 2250 tons capacity. There are about 150 of them, most of them using compressed air for cushions and control systems.

On two of the large triple action presses, the ram thrust is 950 tons for the first action, the blank holder action is 550 tons and finally a third action of 750 tons completes the work of forming that part of the body. For each car body produced, about 1000 lb of steel is allotted, this being finally trimmed down to approximately 770 lb along the production line.

Perhaps one of the most important operations in the body plant requiring the use of compressed air is in the spraying of paint, from the rust inhibitive paint on underbody side members to the final coat. An average of about 5000 cfm in compressed air is used in various operations in this plant. It is estimated that a large part of this is taken up by the spray guns in finishing the bodies. Air pressures for this purpose run from 75 to 90 psi. Approximately 400 spray guns are used in this plant, including guns for undercoating of bodies, touching up and the high pressure guns for body painting. The air taken by these guns averages about 13 cfm, but some of the heavy duty types take from 15 to 20 cfm.

In the paint spray booths at the Nash body plant, the operators, wearing respirators, work as if they were on the job in any other part of the building, as the booths are properly ventilated with a fresh air velocity of about 150 fpm, which is considered more than safe for the operator's health and efficiency, as all fumes from the spray are exhausted through air washers to the outside of the building.

Predetermined settings of the guns, for the proper mixture of paint and compressed air, make readjustment by the operator unnecessary. An experienced operator

Fig. 1—Grinding of a die section with an air tool during the spotting of a die

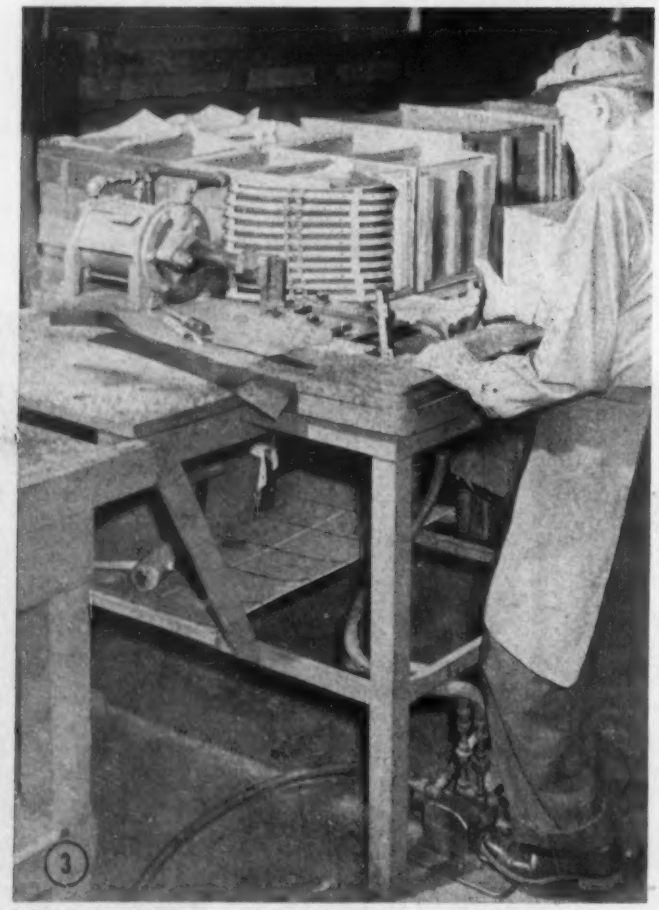


Fig. 2—View of assembly line on which operators are using a battery of gun type, air-actuated spot-welding equipment

Fig. 3—Operator using air-actuated piston device to set glass into frame of front door ventilator

covers a given surface with paint repeatedly in about the same time to the correct thickness on hundreds of car body sections per day.

In many other sections of this 5-story body plant compressed air plays an important part in getting parts of the bodies ready for the assembly line. Dies used for body making are touched up with the use of a pneumatic grinder, as shown in Fig. 1. This grinding of a die section is performed during the spotting of a large die to be used for body panel forming.

Fig. 3 shows a man at work setting the glass into the chromium plate frame for the front door ventilator. Placing the metal frame around the glass, over rubber cushioning material, the operator presses the foot lever which opens a valve on the compressed air cylinder on the table, forcing the piston out and completing the operation of installing the frame on the glass.

Some of the other uses made of compressed air are for devices such as pneumatic screw drivers, air drills and wrenches required for high speed work, while some air drills are used for turning paddles to mix drawing compound. Many of the smaller tools are used with small hand wheels and mounted points. In the assembly line illustration (Fig 2), men can be seen using a battery of gun-type, air-actuated spotwelding equipment.

Assembly line on the fifth floor of the body plant makes good use of compressed air. Framing fixtures travel slowly along a large elliptical track with the sides, roof and underbodies being assembled while the line is moving slowly ahead. According to Nash officials, this method of assembly originated in this plant.

All compressed air used in the plant originates from a central compressor room, located to save as much trunk line piping as possible, and with (*Please turn to Page* 129)

Selection and Installation of

THERMOCOUPLE LEADWIRES

In industries where process control involves use of thermocouples, selection of extension leadwires on the basis of thermo-electric characteristics of metals used is necessary insurance against faulty product quality and production

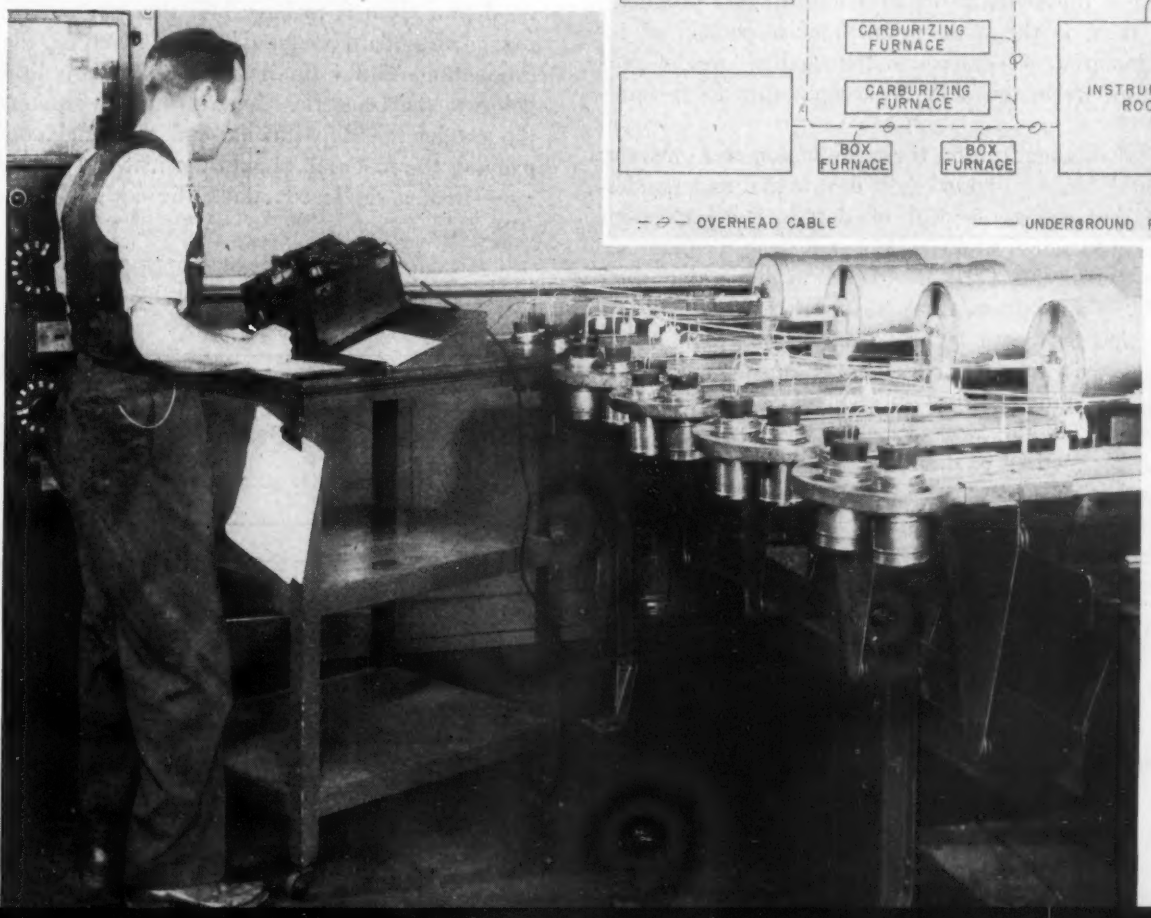
ACCURACY of any pyrometer system can be no better than the inherent precision of its components. Generally, the user will exercise the utmost care in the selection of an accurate indicating or recording instrument or a precision thermocouple, but will frequently neglect the all-important factor of the wiring between the two.

Even though proper consideration is given to such factors as the ambient temperature gradient between thermocouple and indicating instrument, and the mechanical protection of the leadwires, the less common aspects of electrical-mechanical installation and the insulation properties are often overlooked.

Temperature indication in pyrometry is obtained from the measurement of the electromotive force developed by a thermocouple. Electromotive force is determined by the temperature differential between the hot and cold junctions of the thermocouple. If the thermoelectric circuit were confined to the thermocouple proper, variations in the temperature at the cold junction (terminal head) would introduce an intolerable error. However, when suitable extension leadwire is used to extend the thermocouple to the instrument and thus locate the cold junction at a point where changes in its temperature can be easily and accurately compensated, the required degree of precision can be attained. (*Please turn to Page* 112)

Fig. 1 (*below*)—*Samples of wires, ends of which are welded together, can be seen protruding from the small furnaces used for checking characteristics of the wire; opposite ends of sample are inserted into ice water thermos type containers*

Fig. 2 (*right*)—*Layout representing extension leadwire wiring involved in gear and axle department of Ford's River Rouge plant. All underground wiring is protected by lead conduit. Hardening and carburizing furnaces use* 14 *gage copper-constantan asbestos covered leadwires and chromel-alumel thermocouples. Draw furnaces use* 14 *gage iron-constantan asbestos covered leadwires and iron-constantan thermocouples*



INSPECTING INCOMING MATERIAL

Suggested procedures that may be followed from the time material arrives in a plant until it is finally accepted or rejected are outlined here by the author. He also presents some requirements for a typical inspector training course

LARGE industries usually depend on outside sources to supply much of the material used. These vendors each have individual concepts of quality, and these many views or criteria of acceptability have to be adjudged on the basis of acceptability of the purchaser. Such a problem involves both engineering and economic aspects to its solution.

Some uniform system of examination of incoming material must be incorporated into the inspection department. A uniform system of disposing of material rejected must be set up. A method of recording and reporting the results should be available. Gages, microscopes, micrometers, testing machines necessary to the particular inspection must be acquired. Finally, vendor relationships must be established in an effort to obtain vendor cooperation in the manufacture of a high quality product.

This, then, is the main problem of inspection of incoming material: To determine the quality level of purchased product in terms of its acceptability to the purchaser.

As a broad classification the examination of a quantity of material can be divided into destructive and nondestructive inspections. Typical of destructive inspections are breaking strengths, elongations and flash temperature. Products which must be destroyed to determine their acceptability are bullets, fuses and fuels.

Inspection itself can be made either on a detailed or sampling basis if the inspection is nondestructive. A detailed inspection means inspection of each unit of the lot. However, in the case of destructive inspection, the only feasible method of determining acceptability is on a sampling basis.

Suffice it to say that sampling should be done on a more scientific basis than a fixed percentage of lot size. The sampling can be done either with a single sampling or a double sampling scheme.

Inspected material usually falls immediately into one of two classes, i. e., acceptable or rejectable. One important rule in the handling of material in the process of inspection is that the material should be identified so far as its status is concerned; accordingly, once the material is classified, it should be identified by one of the tags shown in Figs. 2 and 3.

Occasionally, the acceptability of the material is not readily determined or is open to challenge. In this event, the material should be tagged as shown in Fig. 4 which shows a tag with a perforated section to be removed and retained by the inspection department in event the material is accepted. Should the material be rejected the entire tag is destroyed and replaced with the reject tag shown in Fig. 3.

In isolated cases the engineer in charge of production may decide that certain minor deviations from specification should be overlooked and the material accepted. A good procedure is to have him sign an "authorization to pass nonstandard material" form, releasing the lot into production. This form is issued in quadruplicate, copies going to the inspection department, the issuing engineer, the production department, and the final copy accompanying the material. Should the material be conveyed in more than a single container, the additional carriers are

By EUGENE GODDESS
North American Philips Co. Inc
Dobbs Ferry, N. Y.

NC 1226-2M 12-44

NON-STANDARD MATERIAL

PERMIT NO. _____ PART NO. _____

DEVIATION FROM LIMITS _____

SPECIAL ATTENTION

THIS TAG MUST REMAIN WITH MATERIAL UNTIL FINAL DESTINATION IS REACHED

DO NOT MIX THIS MATERIAL WITH ANY OTHER

ATTACH TAG TO EACH RECEPTACLE

tagged with a tag as shown in Fig. 1, which is removed only by the foreman receiving the nonstandard material. This tag is necessary so that any deviations from standard specifications is immediately discernible.

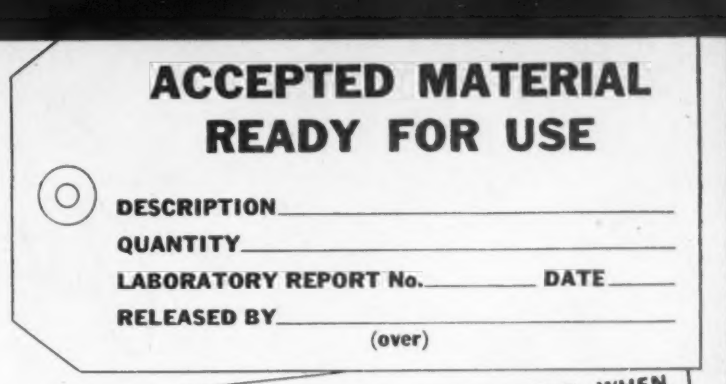
Material that is to be rejected and tagged as per Fig. 3 requires special attention before this last step is taken due to the many aspects of factory activity involved. In order to make a rejection "stick" a procedure must be outlined which states the basis for rejection, the method of reporting the rejection, and a mechanism for disposition of rejected material.

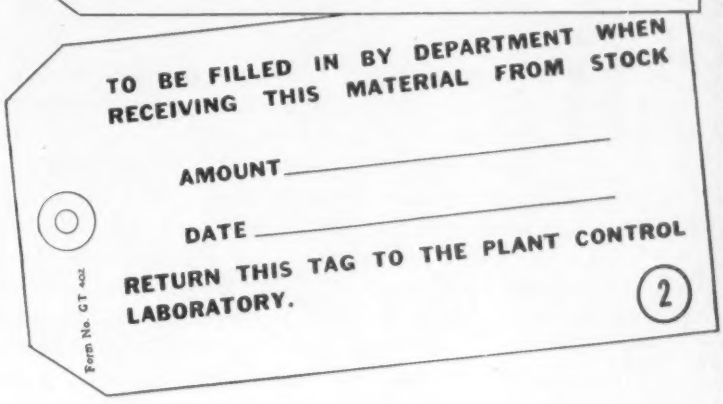
Material may be rejected for (°): (a) Failure to comply with the requirements of the formal specification under which material is purchased; (b) failure of the material to meet any informal specification agreement between the company and the individual supplier; (c) failure to meet the supplier's published specifications or representations made by the supplier prior to purchase; and (d) failure of the supplier to maintain quality and uniformity equivalent to material previously supplied and found to be acceptable.

Once the rejection is made a verbal report may be made by "quality engineering" if speed of disposition is desirable or essential. However, it should always be confirmed promptly by a written report. This report must be checked, signed and issued by the head of "quality engineering" or his designated representative. The following should be shown on all reports: Name and address of supplier, and of consignor if differing from that of the supplier; full description and ordering information; quantity of material covered by inspection; and reason for rejection.

The written report should then be distributed to interested individuals and departments in the plant always including: Appropriate head of either the section using the material; purchasing and planning departments; and quality engineering file.

"Rejected material" tags (*Please turn to Page* 104)




TO BE FILLED IN BY DEPARTMENT WHEN RECEIVING THIS MATERIAL FROM STOCK
AMOUNT
DATE
RETURN THIS TAG TO THE PLANT CONTROL LABORATORY.
Form No. GT 402
2

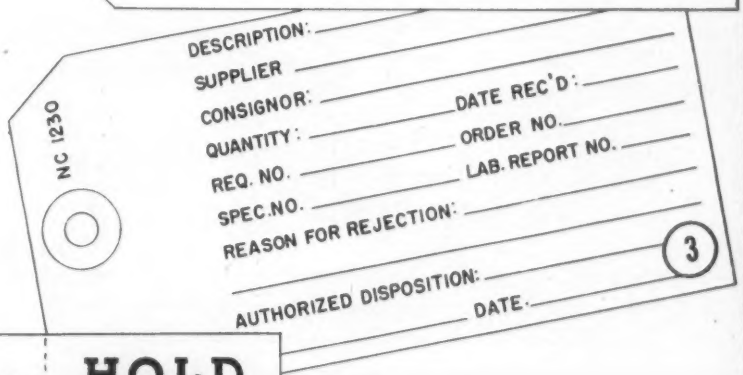


Fig. 1—Material having minor deviations from specifications and which is accepted should have this form, removable by foreman receiving nonstandard material

Fig. 2—Reproduction of front and back sides of tag to be attached to accepted material

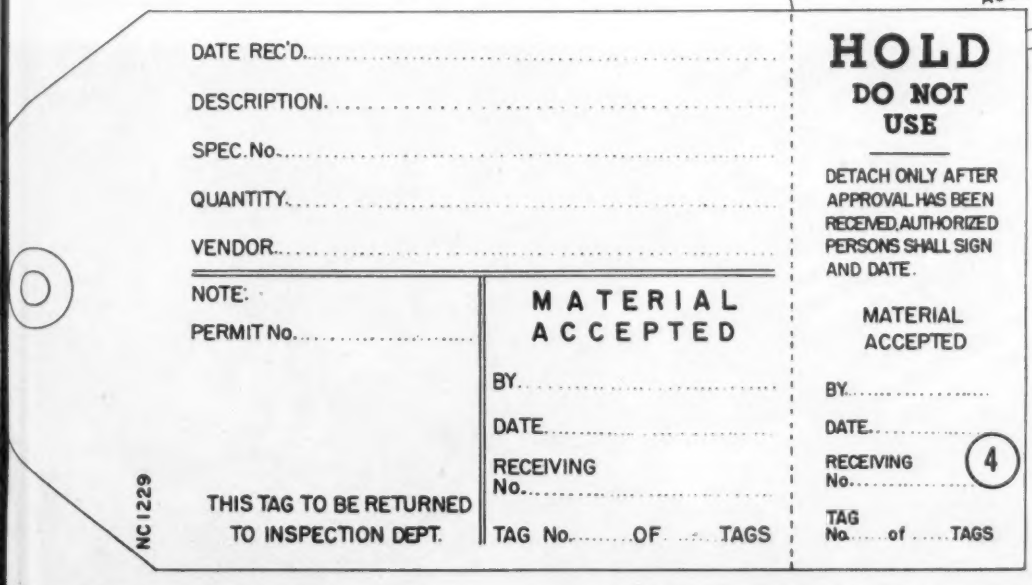


Fig. 3—Both sides of tag to be placed on rejected material by the inspection department

Fig. 4 — Material, acceptability of which is not readily determined or is open to challenge, should be marked with this tag, perforated section of which is retained by inspection department if it is accepted

Casting Fastening Hardware

MANUFACTURE of fastenings for use in masonry, concrete and similar applications constitutes an important and highly competitive branch of the metalworking industry. Production must be rapid and efficient to insure sales at reasonable profit. Most elements used are made by casting, stamping, heading or wire forming operations, all of which are employed in the plant of the J. Edward Ogden Corp., Bayonne, N. J. Here considered, however, are only the cast products made in two separate departments devoted respectively to zinc and lead alloy. All save a small proportion is die cast. Casting production is at a high rate, and assembly and packing are done on a correspondingly rapid and efficient basis.

Several of the cast components manufactured are illustrated in Fig. 2. These include expansion bolt shields and nuts in Zamak 5 zinc alloy and some antimonial lead components. The latter are employed for parts that must be soft enough to cold flow to accommodate themselves to the hole in which the fastening is inserted.

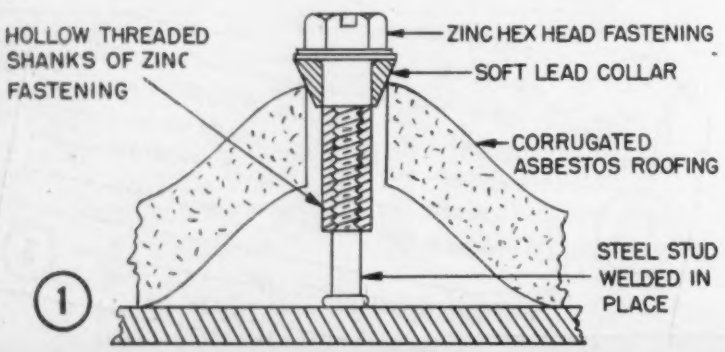
Newest of the fastening devices are those for corrugated roofing tile and sheathing made from asbestos-cement mixtures. These fastenings include a short tubular element having a slotted hex head die cast in zinc alloy. The tubular portion includes a cast internal thread and is made in three lengths as shown at *a*, Fig. 2. A gate of five of these castings is shown at *c*. At *b* is one of the conical lead collars cast in gates of ten as shown at *d*. At *e* is a gate in which ten of the zinc parts were assembled prior to trimming.

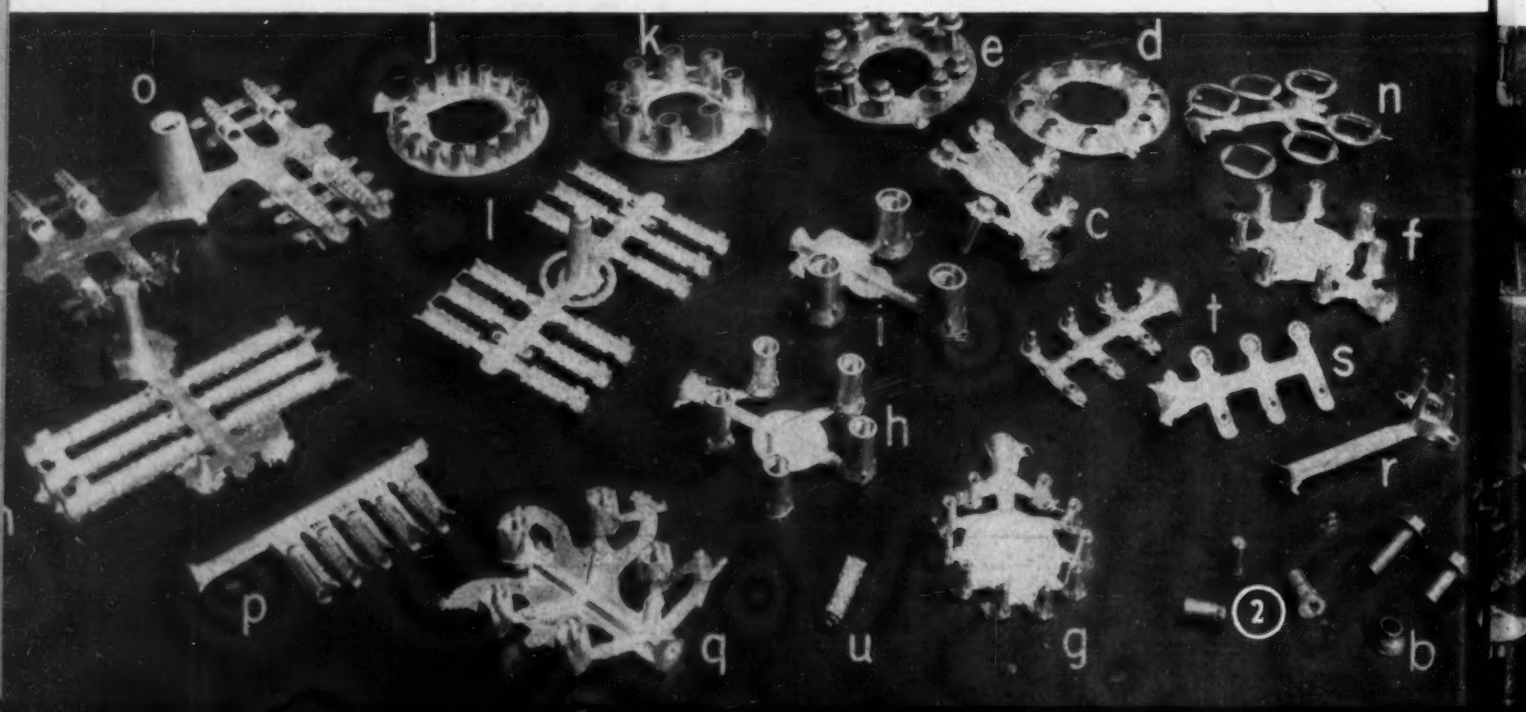
Gates of the zinc elements are shown as they come from the Kipcaster, Fig. 4, in which the die is shown open and gates of castings just removed from the die. The gates are cast at the rate of 300 per hour and, as the core in each of the five castings is threaded, each core must be unscrewed. This is accomplished as follows: Each core is attached to a pinion which meshes with a central gear inside the die. The gear is on a square shaft fitting the hub of a friction clutch back of the die.

While the die is closed and cast is made, the cores remain fixed, but as the die is opened, the core clutch engages a flywheel mounted inside a guard at the back of the machine and is rotated continuously by a belt from a driving motor. As the clutch is engaged, gear and pinions start to rotate and turn the cores which, being threaded, force the gate of castings out of the rear half of the die, as desired. When die is closed for the next shot, the clutch disengages and stops.

After cooling, gates of castings are charged into a Howard tumbler which holds about five barrels of gates, and in which the individual castings are broken off by the tumbling process. Flash on the castings is also removed by tumbling. At the end of the tumbling cycle, the rotating drum of the tumbler is reversed and the machine automatically separates the castings from the gates, depositing the castings in one barrel and the gates (which include runners and sprue) in another.

Lead alloy collars to be applied over tubular shanks





with Dies and Metal Molds

In processing shields and other components used with expansion bolts and similar fastenings, units, often including threads, are cast from zinc and lead alloys at a high production rate

By HERBERT CHASE

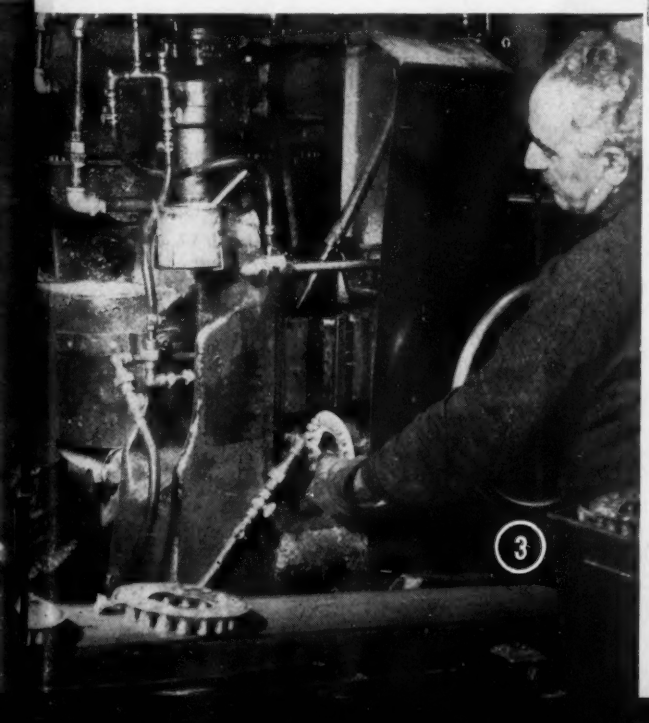
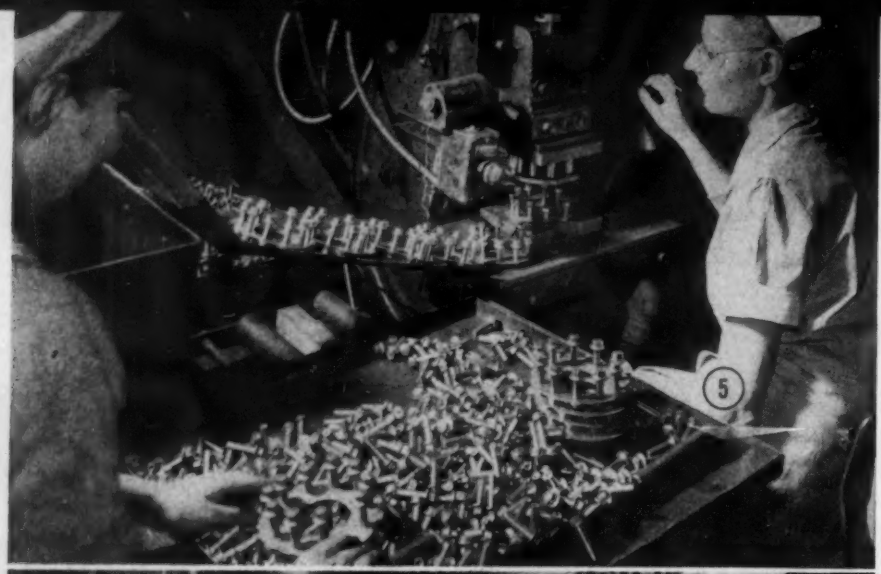


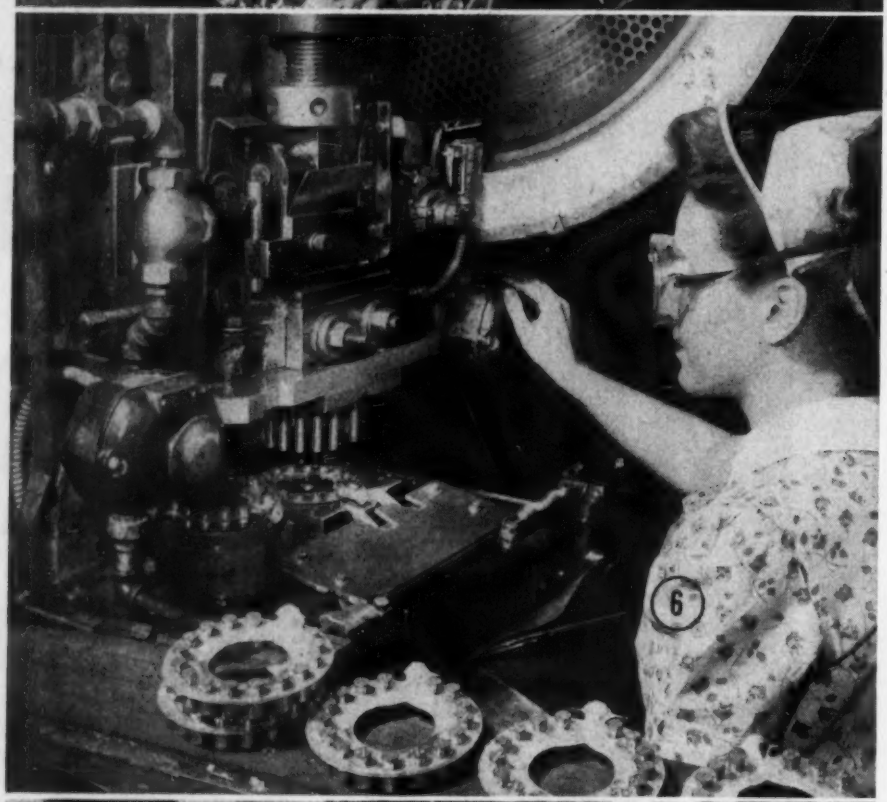
Fig. 1—Diagram showing how fastenings produced and assembled in Figs. 4 and 5 are applied over steel studs after latter are welded with special gun to steel supports

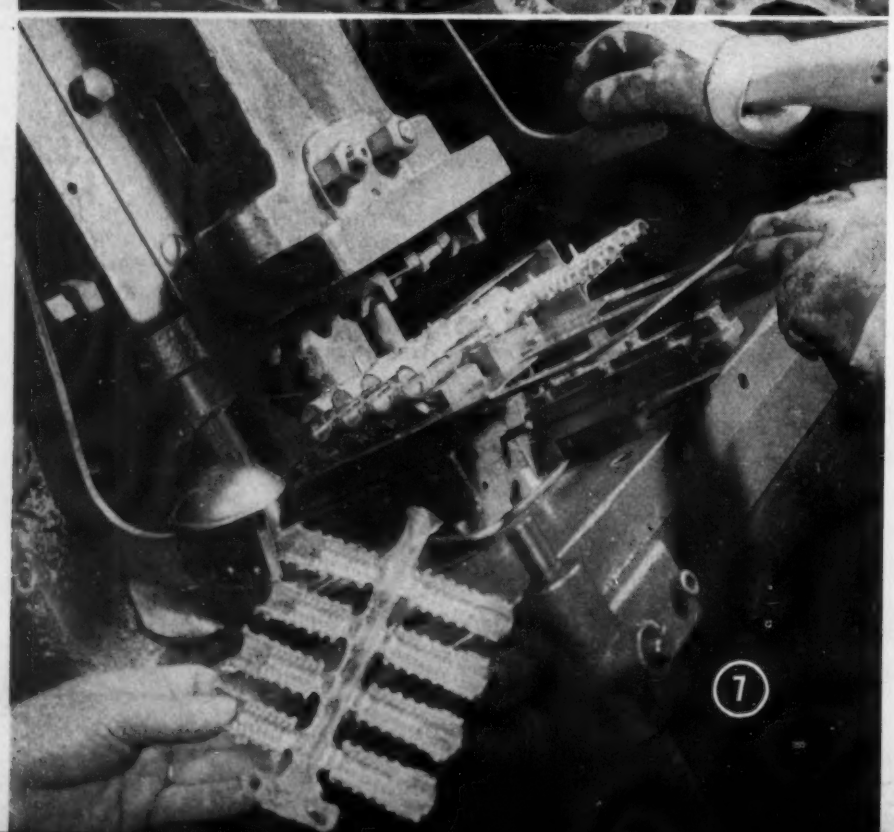
Fig. 2—Components of fastening devices nearly all of which are die cast in zinc or lead alloy. Gates marked r, s and t have small steel inserts and are used for straightening or holding pins of radio tubes undergoing assembly. Part u is a lead anchor produced in gravity-poured permanent mold

Fig. 3—Producing die cast lead sleeves in gates of 16 for assembly to zinc nuts that are tapered to spread sleeve when tightened

Fig. 4—Die casting zinc alloy fastenings for corrugated composition roofing tile and sheathing in gates of five parts. Internal threads are formed by cores that are unscrewed after die is opened. This process also ejects castings







of the fastenings are die cast in a Kipcaster in a separate department on another floor. Gates of ten castings each are produced at the rate of 450 per hour. Each casting has a straight cored hole with no thread and so need only be stripped off the core pins. Gates are then delivered to the setup shown in Fig. 5 where girls, seated at benches, load one of the hex-headed zinc castings into each cored hole in the lead gates and pass these assemblies down a chute to a press operator who sets each gate in a trim die in a punch press.

When the ram of press descends, it first presses the hex headed fastening into holes in the gate until the flange under the head seats against the cone which has the same outer diameter as the flange. Further motion of the punch shears the flash and forces the cones and fastenings through the die. They fall on a conveyor which discharges them into a box for shipment. Lead flash remaining on top of the die is stripped off the punches and is thrown into a tote box for return to the lead casting machine.

Ten assemblies are thus completed at each stroke of the press. The latter is stopped at the end of each 150 strokes when the shipping box is filled. A counter operated by the press shows the number of strokes made, hence no counting of the assemblies is required. The internally-threaded shank assemblies are designed for application over ¼-in. studs or bolts having male machine threads, as shown in Fig. 1. In many cases, the stud is applied by a Nelson welding gun inserted through the hole in the tile, so that all fastening is done from the outside.

As Fig. 1 shows, the lead core fits the hole and is soft enough to be distorted. This makes a water-tight joint as the flanged head is turned down with a screwdriver or wrench. As both lead and zinc are resistant to corrosion and any corrosion products formed are white anyway, the tile or sheathing are not discolored.

Quite similar is the production of "Tampin" products which consist of a die

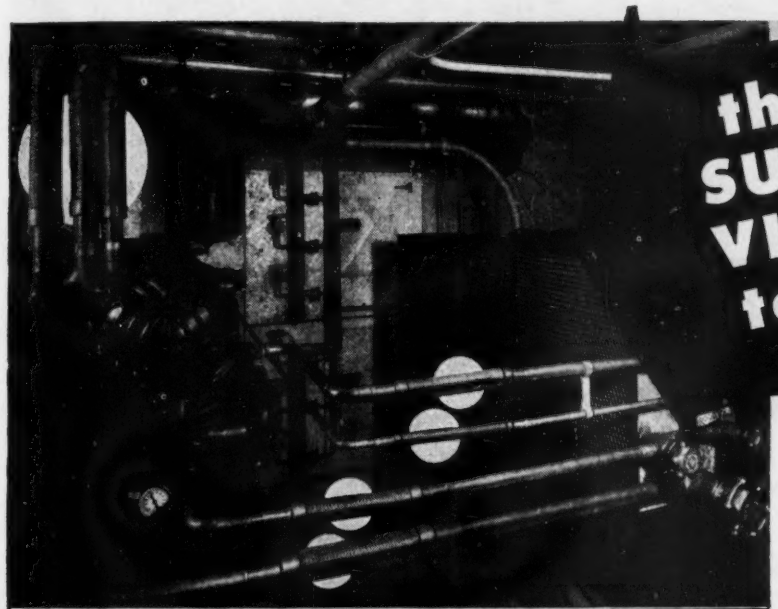
Fig. 5 — Assembly of fastenings shown in Fig. 4 to conical die cast lead alloy rings in gates of ten. As zinc castings are pushed home by press, lead cones are sheared from gate and assemblies fall through die onto conveyor

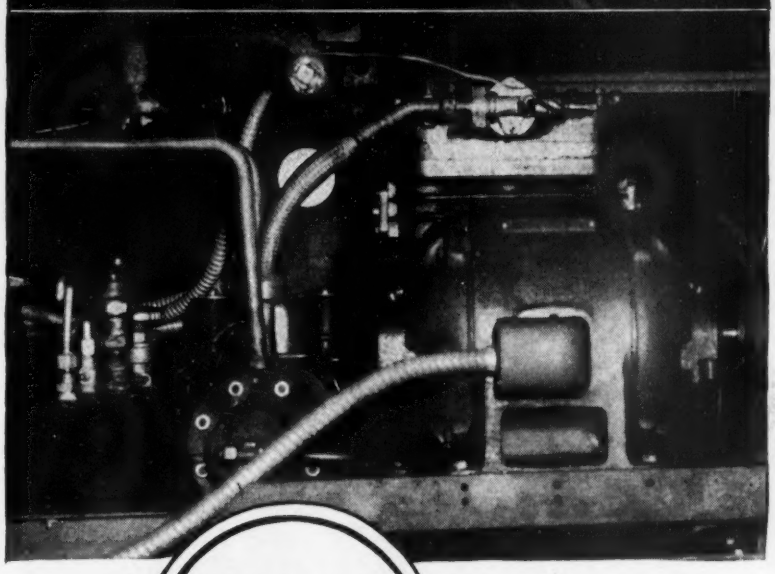
Fig. 6—After zinc nuts are placed inside lead sleeves in this gate of castings, assembly is placed in press, nuts forced down and sleeves sheared from gate in trim die

Fig. 7—Punch press setup in which three gates of lag bolt shields are placed in die

... for high and low frequency

VIBRATION DAMPING





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cast zinc alloy nut having a conical outer end, with lugs that prevent turning, and a mating tubular die cast lead shield. This product is designed for tamping into a hole. When in place, the lead portion is expanded by striking with a tamping tool. Further expansion of the lead results when the machine threaded screw that fits the nut is drawn tight.

Tamping zinc nuts are die cast with the thread formed by the core in a setup almost identical to that in Fig. 4 except that the die has cavities of different shape. Gates of these castings, shown at *f*, *g*, *h*, and *i*, Fig. 2, contain 3 to 10 nuts each and the castings are broken from the gates in the Howard tumbler, as with the fastening already described.

Lead sleeves to fit the nuts are produced in the Kipcaster, Fig. 3, in gates having up to 18 castings each. Two such gates are shown at *j* and *k*, Fig. 2. As gates, produced at the rate of about 450 per hour, come from the machine, Fig. 3, they are laid on a belt conveyor or in tote boxes for transfer to the trim press, Fig. 6. Enroute to this press, girls seated along the belt beside trays filled with die cast nuts insert one nut in each sleeve on each gate.

Gates thus loaded are picked off the conveyor by the press operator and first are placed under an extension of the die which merely presses the nuts down to uniform height in the lead sleeves. On the next stroke of the press, the gate is shifted into a position over the trim die and, as the punches descend, each of them pushes one sleeve and one nut through the trim die, leaving the flash on top of the die from which an air ejector throws the flash into a chute, whence it slides onto a belt and is returned to the melting pot of the casting machine.

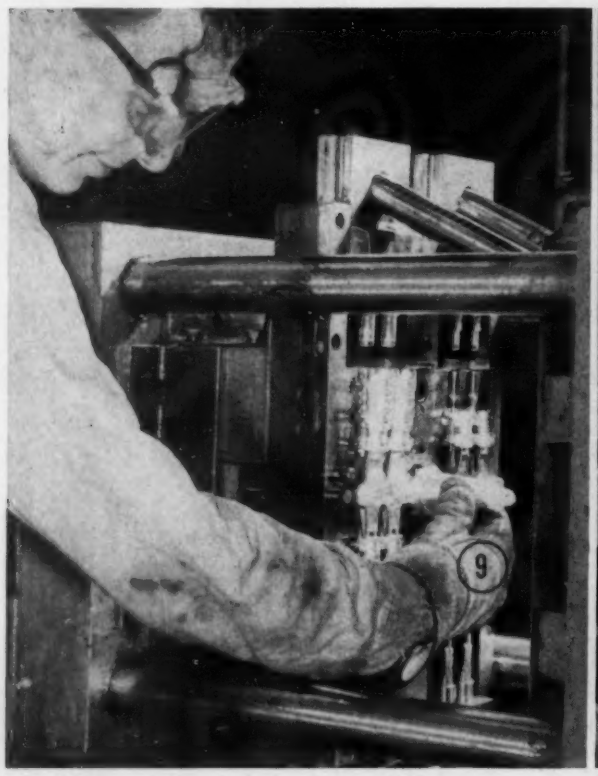
Press in Fig. 6 is on a platform. Assemblies pushed through the trim die fall down a chute into cartons set on a horizontal dial arranged for indexing each time a carton receives a given number (50 or 100) of assemblies. At this station, a girl places cartons on the dial and removes them after they are substantially filled. Often she adds one or more to make up the number stamped on the carton and weighs the latter, as loaded, to check on the contents. Then

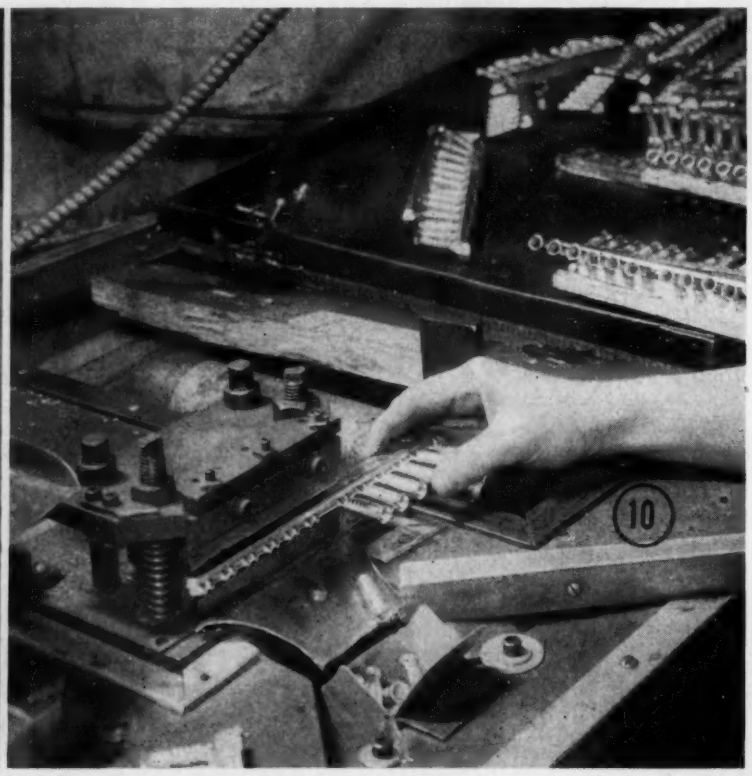
(*Please turn to Page* 130)

Fig. 8—*Three permanent molds in which gates of* 12 *lead anchors are gravity cast*

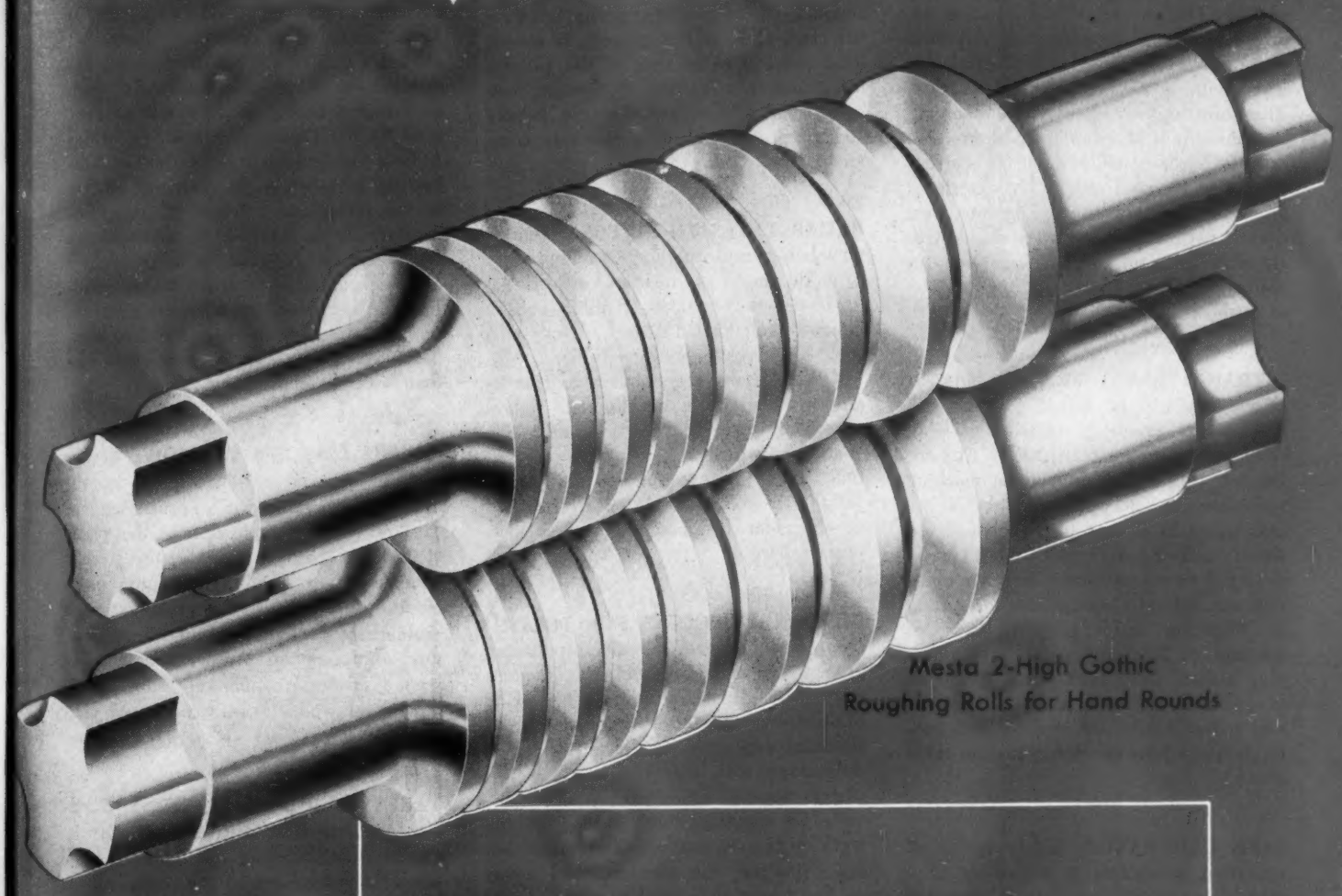
Fig. 9—*Die with gate of four parts of shields cast in zinc alloy about to be removed*

Fig. 10—*Solenoid-operated knife which cuts six lead castings from the gate when solenoid is operated*





MESTA ROLLS



Mesta 2-High Gothic
Roughing Rolls for Hand Rounds

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Engineering News *at a Glance*

SIMPLIFIES STAINLESS POLISHING: Equipment used by a new method for polishing stainless steel, described in a manual issued by E. I. DuPont De Nemours & Co., Wilmington, Del., is substantially the same as for electroplating. The technique which makes use of a solution of glycolic acid, sulphuric acid and water provides the metal finisher with a new economical method. The solution, according to the manual, remains liquid at room temperature and operates over a wide range of current densities. Its nonfreezing characteristics also eliminate temperature maintenance during periodic or weekend shutdowns. In addition, nontechnical operators can easily control and maintain the method at peak efficiency.

"STRAIGHTENS" BENT SHAFTS: Display which in effect "straightens" bent shafts under simulated operating conditions is to be featured by Ahlberg Bearing Co. at the forthcoming machine tool show in Chicago. Principle of the demonstration is that the company's internal self-aligning ball bearings mounted in pillow blocks or other housings can naturally compensate for sprung or whipping shafts without injury to bearings or lubricant seals. In the display a steel shaft bent purposely to an exaggerated degree is mounted between two pillow blocks and driven by a motor to show how the compensation takes place.

SAFE GENERATOR: Safety under all operating conditions is a feature of a portable acetylene generator designed by the engineering division of the AAF's materiel command for use with 55-gal steel fuel drums, Office of Technical Services, Washington, reports. Weighing only 48 lb, it has a capacity of about 25 lb of carbide, and produces sufficient acetylene to cut a 2-in. block of steel. During several experimental runs, in which the drum was charged with 25 lb of carbide and gas produced at maximum capacity, it was found that the safety mechanism operated satisfactorily at pressures from 14 to 15 psi, and that the drum was of sufficient capacity to avoid overheating during peak production periods.

TRIALS OF RESEARCH: Problem of recovering alumina—element from which aluminum metal is made—long engaged the attention of chemists, according to Domestic Commerce, published by the Department of Commerce. The publication points out that during the past 75 years at least 60 processes were proposed to accomplish this objective. Most of them were found impractical because of the high cost and low purity of the product. A hydrochloric-acid extraction process developed by the Bureau of Standards is said to provide alumina of an average purity of 99.8 per cent. Cost of this process, however, is at present twice that of the process using imported bauxite. Studies are now being made to reduce the cost figures and adapt pilot plant methods to commercial processes.

RADAR TAKES TO RIVERS: Radar is now being used on the Mississippi river to guide one of the most powerful diesel towboats—the Sohioan, flagship of the Sohio Petroleum Co.'s fleet of four vessels. The Westinghouse equipment was installed aboard the Sohioan to test its ability to minimize or eliminate delays caused by fog, heavy rains and snow conditions which at times make navigation of river tows impossible. About 120,000 barrels of crude oil are handled by the radar-equipped vessel when towing six barges.

REVERSED PROCESS FOR POLISHING: An improved electropolishing process for stainless steel was demonstrated by American Rolling Mill Co., Middletown, O., at the recent industrial finishing exposition in Detroit—held in connection with the American Electroplaters Society. Essentially, it is the reverse of electroplating. Instead of the work acting as cathode and metal being deposited, the stainless steel serves as the anode and metal is removed. On cold-drawn stainless wire products only 2 to 8 minutes is necessary for a good polish. The process requires little longer periods on rough surfaces, castings and forgings, for example. Amount of metal removed is usually only a half-thousandth to a thousandth of an inch. Solutions used include citric-sulphuric acid, glycolic-sulphuric acid and phosphoric acid-butyl alcohol solution. In operation, solution temperature is held between 185 and 200° F.

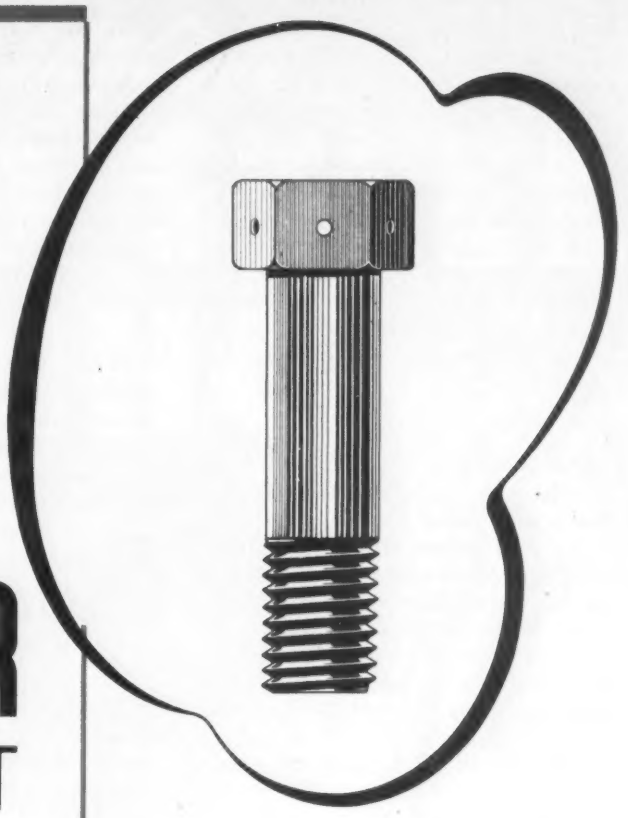
PRODUCES FAST BEADS: Straight edges of thermoplastic type sheeting 0.005 to 0.020-inch thick are beaded at high speed on a repetitively uniform production basis by a machine refined by Sheet Plastics Equipment Division of Taber Instrument Corp., North Tonawanda, N. Y. Cellulose acetate, ethyl cellulose, vinyl acetate, cellulose nitrate and similar sheet stock, roll material, die-cut blanks or strips are beaded by the machine at the rate of 500 to 1000 inches per minute, depending on type and thickness of material. It also forms nine standard beads, each of a different size.

CALIBRATES PYROMETERS TOO: Sinter meter developed by Harry W. Dietert Co., Detroit, for determining refractoriness of molding materials, such as foundry sands, recently was discovered by the Canadian Bureau of Mines to be a fast and accurate method of calibrating pyrometers. A platinum ribbon in the meter can be held at any temperature up to 3000° F. In addition the instrument is designed so a pyrometer can be held in position for taking readings. In the procedure, a master pyrometer is used to first determine ribbon temperature, and working pyrometers are then used to take check readings.

UNUSUAL STORM WINDOW: Screen and two storm panels remain in the frame all year around in an ususual storm window now in production at the plant of Ceco Steel Products Co. The Chicago concern reports the all aluminum combination unit solves the yearly storage problem by including a self-storing feature which enables a user to make a 1-second transformation in substituting screens for winter storm windows or vice versa.

TAKES OVER TOOL BUSINESS: Gardner Accurate Tool Co., Mount Vernon, O., is now handling the cutting tools formerly manufactured by Cooper-Bessemer Corp. The latter concern discontinued making the tools when it was found all of its facilities were required for building its compressors, diesel and gas engines. The new company already is marketing the Boyd machine center which is being made for it by Pipe Machinery Co. of Cleveland. Production is in progress on those having a Morse taper. According to the company, shipment of types not in stock can be made in 30 days.

DRIES SHIP'S MACHINERY: Producing homogeneous hot air of controllable velocity, temperature, quantity and pressure, a heated air generator perfected by Combustion Equipment Division of Todd Shipyards Corp., proved remarkably effective in speeding up the common shipyard operation of drying ship's motors and engineroom machinery—flooded or covered with condensation. A ship lying idle awaiting conversion to peacetime use became submerged in 18



CHANDLER
AGREES THAT

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During the growth of the metal fastener industry, an incredible number of machines was dreamed up, designed and produced for performing each necessary operation in the production of cold headed, threaded parts. Many of these brain children died very young—but nevertheless from this mass of inventiveness came the magnificent machines that hum at CHANDLER'S today.

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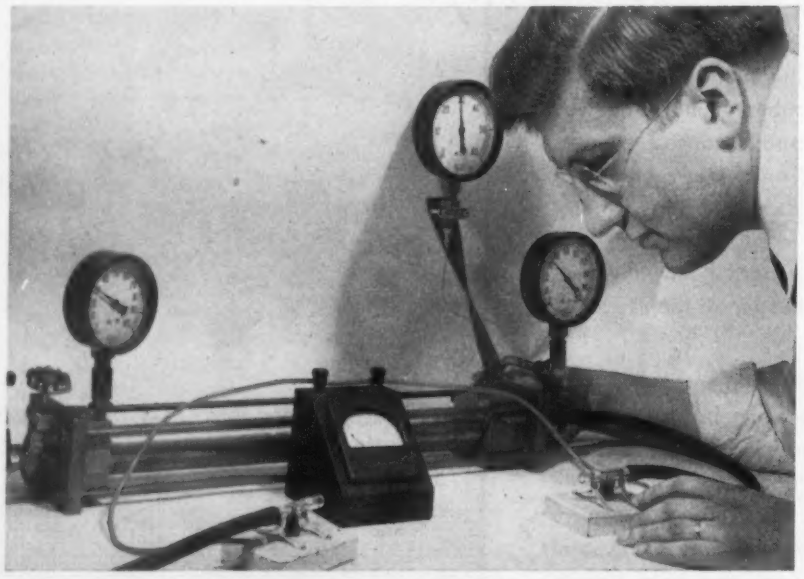
feet of water, flooding the entire engineroom. One of the generators—with a temperature ability of 350° F, and a capacity of 10,000 cubic feet per minute—dried out the vessel in 3 days with the aid of two men. Normally, the job requires 3 to 4 weeks, depending on which of the more common methods are used. It is estimated that a minimum of 120 giant infrared lamps with at least a dozen men working full time would have been required for the job if one of the common methods had been employed.

MINE ROOFING SPEEDED: Sixty per cent less time is required to set in place heavy timbers for roof support in the mines of Tennessee Coal, Iron & Railroad Co., Birmingham, by means of a special timber-setting truck. The equipment, which employs a hydraulic system, conveyor and boom, handles timbers weighing up to 900 pounds with ease and safety. In operation, a timber is rolled along the conveyor to the cradle at the end of the boom where it is secured by four clamps. The 10-foot boom is then raised hydraulically by a hand pump. About 2 minutes are required to raise it with its load from 4 feet above the track to a height of 12 feet. At that height, the cradle can be turned completely around, and the boom can be swung 45 degrees to either side of the track to position the timber against the mine roof, holding it there until anchored. Ratchet device prevents the boom from dropping in event of trouble with the hydraulic system.

GAGES AVAILABLE AGAIN: Huggenberger tensometers, their supply exhausted early in the war after imports from Switzerland ceased, are again being supplied to American customers by Baldwin Locomotive Works, Philadelphia. Light in weight, compact and easy to use, the instrument was one of the first to simplify strain measurement, making it possible to detect strains in the field as well as the laboratory.

ONLY ONE WELD: One weld instead of 33 individual spot welds is now required to produce a bus body pillar manufactured in the plant of Hawthorne Metal Products Co., Detroit. The reinforced pillar, fabricated from 13 separate stampings was designed originally for single spot welding. When the job was released for production, the welding equipment supplier, Progressive Welder Co., Detroit, recommended the forming of a series of projections in five of the stampings—at the same time these were produced. The new stampings were then attached to the pillars by projection welding with the aid of a press welder. As a result only one "weld" was required to join each of the five stampings to the pillar proper. In addition, the productivity of the welding equipment was doubled—100 completed assemblies being produced per hour in comparison to the former 50.



HOT AIR OR COLD: Like the "blue glow" in Edison's experimental electric light, the "hot-cold pipe," shown here, which converts ordinary compressed air into both hot or cold air without the aid of moving parts, may lead to unexpected development. At loss to explain the phenomenon, scientists, conjecture that the cause may be a frictional effect between gases moving at different velocities. In operating this Westinghouse experimental model, which measures 15 in. long and 1 in. diameter, compressed air is pumped into a nozzle at one end of the pipe. There it strikes the tubes inner wall tangential to the diameter and is converted to a whirlpool of spinning gases. Air in the center becomes cold almost instantly while that on the periphery gets warm. The former is drawn off through a ¼-in. opening at the center of one end, while the latter is tapped from the periphery. Its German inventor, R. Hilsch, states that with his original model—a tube 3/10-in. diameter—he was able to produce simultaneous jets at 154° F and 10° F. At present the development holds promise as a handy lab tool for making cold as simply as a Bunsen burner makes heat

CARRIES HEAVY LOADS: Lightweight aluminum roofing material announced recently by Aluminum Co. of America, Pittsburgh, combines features of high strength, exceptional high resistance to industrial atmospheres and reduced roof loads. It is to be fabricated for industrial applications in 32-inch widths, allowing for a side lap of 1½ corrugations; and in 5 through 12-foot lengths, 0.032-inch thick. In addition, the same alloy is to be made in sizes suitable for siding. The development meets safe load requirements ranging from 30-pound per square foot uniformly distributed load on 6-foot 5-inch purlins up to a 105-pound load on 3-foot 6-inch purlins.

AIR BRAKES NOT REQUIRED: Continuous braking horsepower provided through regenerative braking on the two huge 360-ton single-cab electric locomotives built by General Electric for Great Northern Railway is approximately 5750 horsepower between 16.5 and 65 miles per hour. This braking power, in conjunction with the great weight on the locomotive drivers, makes it possible in many cases to handle heavy trains on grades without use of the train air brakes, with a resultant decrease in wheel and brake-shoe maintenance.

BURNS POOR OIL: Because its fuel is metered and premixed with low pressure air to obtain thorough atomization before secondary air is added to support combustion, the low pressure conversion oil burner now made by U. S. Machine Corp., Lebanon, Ind., is said to burn even the poorest oils over wide viscosities with maximum efficiency. It also uses less fuel than generally possible with other burners. Newly developed nozzle incorporated in the unit sprays a mixture of oil and air in uniform cone through orifices so large as to preclude clogging with dirt regardless of the grade of fuel used.

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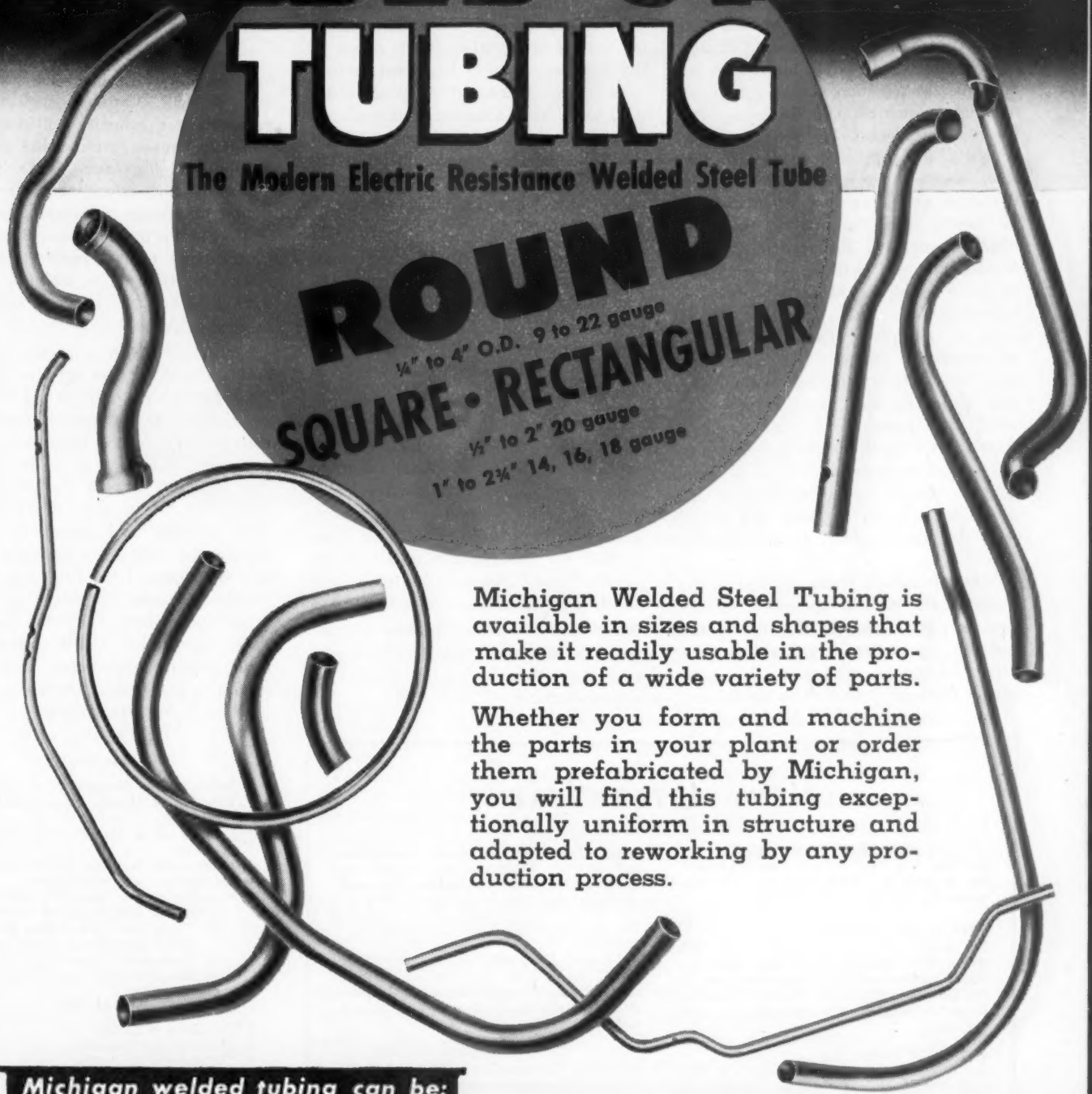

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Incoming Material

(*Continued from Page* 93)

should be attached to all rejected material by the inspection department. These tags must remain with the material until disposition approval is obtained as indicated below.

Copies of form "authorization of disposition of rejected material" are sent to the purchasing department and the appropriate section engineering head, who will then indicate on his copy if he recommends retention and use of the material in question and the reason for his recommendation. He will then sign or initial his copy and send it to the chief engineer for countersignature. If the chief engineer's recommendation is for return of the material to the supplier, approval of the recommendation is automatic and shall be so designated on the form by the head of quality engineering.

If on receipt of the form bearing recommended retention and use, the head of quality engineering has information indicating that use of such material may jeopardize known company standards for quality of the product and/or costs of manufacture, he shall indicate his reasons for questioning the use of the material on the form and return it to the chief engineer for reconsideration.

When decision is finally reached on the material, the original approved copy of the form is retained in the files of the quality engineering department. Then three additional copies of the completed form are prepared by quality engineering and distributed as follows: (1) Appropriate section engineer—for notation and comments and for reference to the department or departments using the material, if it is to be used; (2) tube planning and purchasing departments—planning department will use the copy for correcting or adjusting stores, records, or for requisitioning for replacement if required. Purchasing department will file the copy if the material is to be retained or negotiate for its return to the supplier if such has been recommended and approved; (3) voucher department — for handling financial arrangements on purchased and returned merchandise. The rejected material tag may be removed from a lot or shipment *only* after receipt of approved form showing for "unrestricted" or "restricted" use.

If "return to supplier" is the approved disposition shown on the form, the material shall be shipped on advice of the purchasing department with the "rejected material" tag, Fig. 3, completely filled out and attached to the material or its container.

Before any program of inspector training can be outlined, a decision must be made as to the duties of an inspector. Industrially speaking, the function of an inspector is to determine the economic and engineering suitability of a given product for the use for which it was manufactured. Hence, any information which tends to increase the efficiency or ability of an individual "to determine the economic and engineering suitability of a product" may be broadly termed inspector training.

A typical inspector training course, might very well include the subjects shown at the end of the article. If to program of the type shown is added a series of lectures on reading of blueprints and specifications, the use and care of inspection tools, and a discussion of the attributes of the particular final product under manufacture, a fairly well-rounded-out program of inspector training has been acquired.

Large industrial activity requires many tools to properly inspect the product it buys or sells. Certainly such tools as micrometers, calipers, dividers, and "accurate" scales are needed to make dimensional inspections. In instances where the shapes are irregular, a projection microscope is a useful tool. Depending on the product, equipment should be available (and personnel should be sufficiently trained) to measure and inspect for physical, chemical, and metallurgical properties.

Equipment of an inspection group is best dictated by the specific needs of the industry and the care and tolerances incorporated in the manufacture of the parts and product. An investment in good inspection tools is a desirable economy. The final quality of a product is determined by the quality of its components, assembly and processing. In this picture, the function of incoming inspection is to control the first named. In a well-trained material inspection group, inspection is limited by the inspection tools. Thus other factors being equal, good tools mean good inspection means good product means low losses—means high profit for management.

First Day

1. Statement on the purpose of the course
2. Function of Quality Engineering in the factory
3. Sections of a Quality Engineering department
4. Relationship between Quality Engineering and the Industrial process
5. Concepts of the Inspection unit as a
   a) service department to foremen
   b) "policeman" preventing poor material from being "purchased"
   c) "customer's" representative
   d) managemental representative

Second Day

1. Definition of quality
2. Measurement of quality
3. Detailed (100%) testing
4. Sampling (fractional testing) made necessary
   a) by mass production, and
   b) by destructive testing
5. Two main problems resulting from a sample which fails are:
   a) What is to be done with the lot which contained the sample?
   b) What is to be done to the production process which produced the grand lot which contained the defective sample.
6. The responsibility for Quality rests on the "seller" not the buyer.

Third Day

1. Meaning of random sample
2. Discussion of probability
   a) definition of "event"
   b) definition of "success"

NEW LITERATURE

SOLVES PROBLEMS IN MILLING
By Vlier Mfg. Co., 4552 Beverly boulevard, Los Angeles 4. Sheet describes and illustrates the key for use in milling.

PROCEDURE SHEETS
By Ampco Metal Inc., 1745 South 38th street, Milwaukee 4. Two new procedure sheets discuss welding of dies distributed by the company listing recommended electrodes, correct polarity, currents, amperage and voltage, etc.

AVIATION INDUSTRY
By Westinghouse Electric Corp., P.O. Box 868, Pittsburgh. A 16-page booklet (B-3775) outlining the products and research facilities for the aviation industry.

SAMPLING TECHNIQUES APPLIED TO QUALITY CONTROL
By North American Philips Co. Inc., 100 East 42nd street, New York. Leaflet contains three charts and three tables as well as text material.

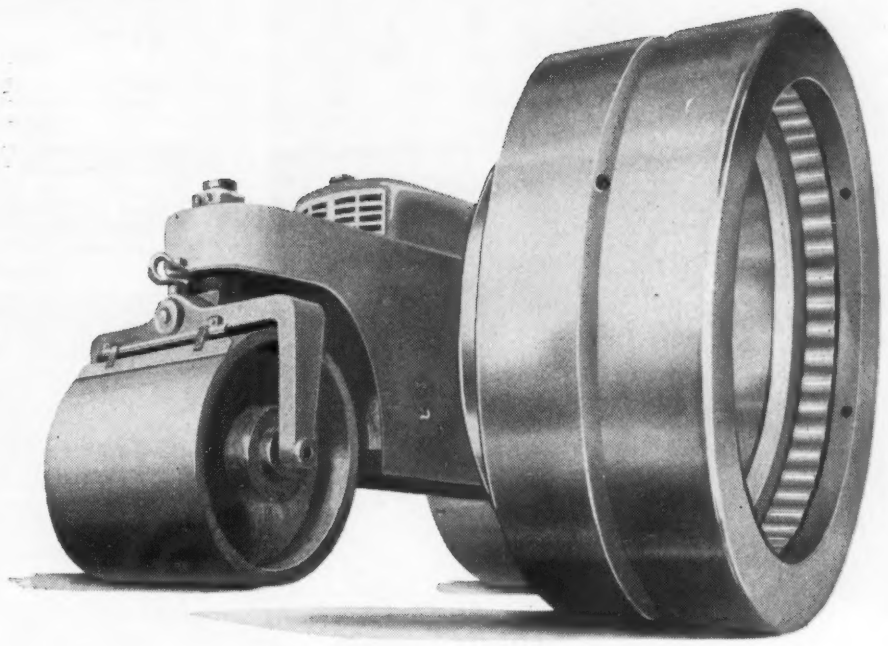
CEMENTED CARBIDE PRICE LIST AND CATALOG
By Adamas Carbide Corp., 1819 Broadway, New York 23. Revised price list and catalog contains new styles, sizes and tolerances for blanks recently adopted by tungsten carbide manufactures; method of computing prices of nonstandard blanks; applications and rockwell hardnesses of standard and special grade designations and new "in-stock" standards available.

PHYSIOLOGICAL AND CLINICAL STUDIES
By Foster D. Snell Inc., 29 West 15th street, New York 11. Bulletin outlines forms of physiological and clinical studies offered by this group of consulting chemists and engineers.

METAL CLEANING OPERATIONS
By Nielco Laboratories, 8129 Lyndon, Detroit 21. Four-page report containing facts and figures on cleaning metal and buying chemicals for cleaning metal.

ROTO-FINISH MECHANICAL FINISHING
By Sturgis Products Co., Sturgis, Mich. Two-color folder shows different types of metal stampings, die castings and other parts and products most conducive to this finishing process. Complete line of Rotor-Finish machinery and equipment is shown.

PROCEEDINGS OF ANNUAL MEETING
By Smoke Prevention Association of America. Booklet gives proceedings of the association's 39th annual meeting and covers the conference on smoke prevention and conservation of fuels.



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c) definition of "relative frequency"
d) definition of "impossibility"
e) definition of "certainty"

3. Theorem of total probability
4. Probability of independent events
5. Probability as a basis for scientific sampling.

Fourth Day

1. Frequency distributions
2. Binomial distributions
3. Normal distributions
4. Poisson distributions
5. Skewed distributions
6. Double humped distributions
7. The use of distribution curves in inspection.

Fifth Day

1. Calculation of the normal distribution curve from observed data.

Sixth Day

1. Single sampling
2. Double sampling
3. Deficiencies in selecting a sample size based on a fixed percentage of the lot.
4. Characteristics of a sample size chosen as a binomial function of the lot size.

Seventh Day

1. Correlation of phenomena.

* Much of the material here was supplied by Research Laboratories of General Cable Co., Bayonne, N. J.—author.

Molten Metal Poured from Fork Truck Mounted Ladle

Transporting molten metal from cupola to pouring floor with sufficient speed to conserve heat and expedite production may be accomplished by a power industrial truck, built by Elwell-Parker Electric Co., 4205 St. Clair avenue, Cleveland 14. It has a ladle mounted on a base equipped with built-in sleeve pallets, the truck itself having a rotating head and fork. The truck operator controls all movements of the truck and also operates the ladle from his platform at rear of the machine.

Trunnions in a frame of welded steel plate suport the ladle which has a 28 in. unlined diameter. Two sleeve pallets are welded into the base of the frame. The truck is a standard unit of 4000 lb capacity, equipped with a rotating head originally designed for use with a semicircular steel apron for manipulating heavy cylindrical objects.

In equipment used by foundries, a fork is bolted to the rotating head, this in turn engaging the sleeves in the base of the ladle which is held firm in position for tilting and pouring. The rotating head is detachable and the fork itself may be attached directly to the truck's elevating mechanism, thus allowing for use as a standard fork type truck.

—o—

Voluntary simplified practice recommendation for standard galvanized ware has been approved for promulgation by National Bureau of Standards and is available from the Government Printing Office, Washington. The recommendation, identified as R2266-47, concerns the capacities or dimensions of both hot dipped and sheet construction types of standard grade galvanized ware.

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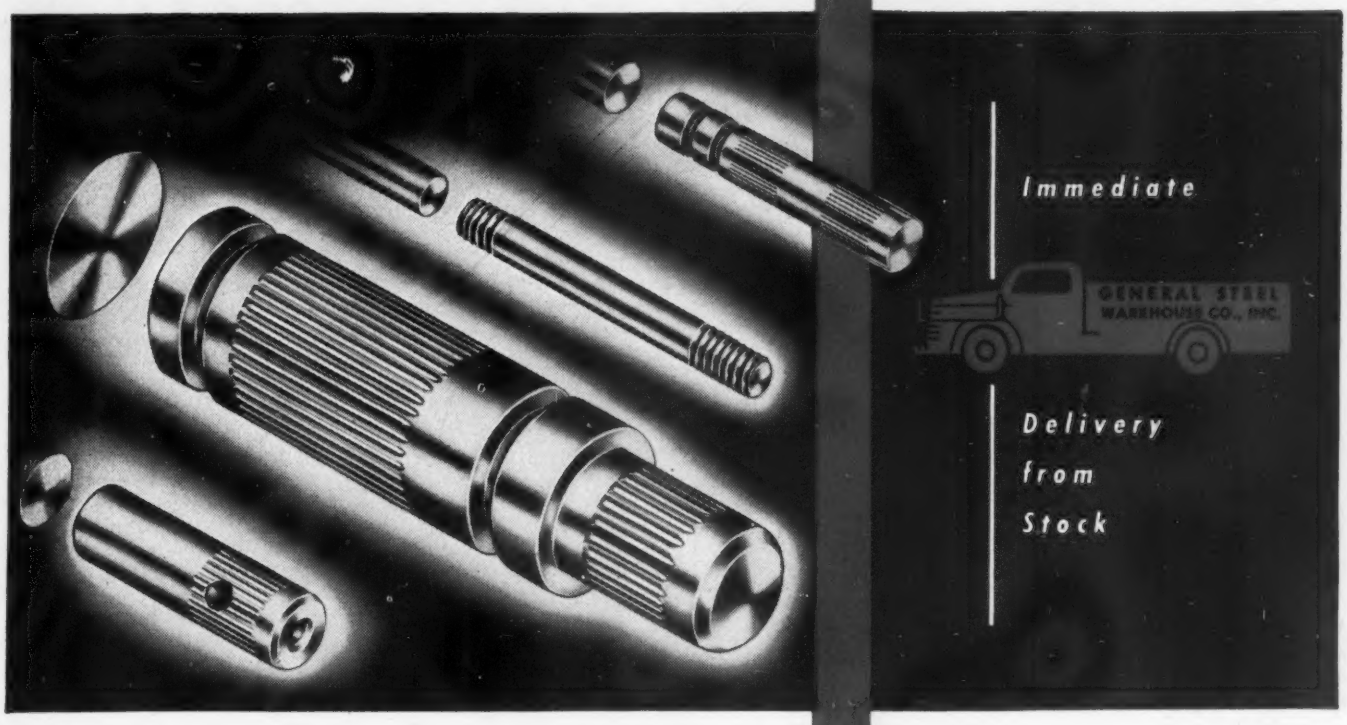

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CONDITIONING

Hot Dip Galvanizing

BATHS

By WALLACE G. IMHOFF
President
Wallace G. Imhoff Co.
Los Angeles

Bunched nails caused by excess aluminum in the bath producing a sticky coating

HOT-DIP galvanizing of small articles such as nails sometimes develop into a difficult problem. Early methods, involving the use of paddle machines and similar devices, often produced nails and small work in frozen masses, or chunks. Some companies discovered that there were many other things involved besides throwing off excessive zinc. One operator discontinued using the excess metal thrown off the centrifugal work because it greatly increased his dross production. Others were much involved in the finish of fine nails, while still others were interested in the metal used per ton of product. Probably the most serious problem is sticking or freezing of large chunks of nails, while the nails not stuck in chunks are left with a rough, unsightly coating.

Bath Conditioning: The correct revolution per minute, the proper basket load, mechanical conditions, bath temperature and metal condition are important.

Impurities in the galvanizing bath, even though in small amounts have a decided influence on the character and finish of the coating produced, and on the operating conditions of the bath itself. Some impurities are beneficial and some harmful. Some of the impurities are metal and alloy additions to the bath that are made deliberate for specific purposes; others are impurities that develop in the process, such as iron content of the bath.

It must always be kept in mind that zinc coatings may be classified into at least two main classes: Those that are spangled, and those that are nonspangled. In addition to the finish there are other vital factors that must be considered, such as zinc per ton of product, roughness of the finish, weight of coating, thickness of coating, runoff metal. One of the most important is fluidity of the metal, freezing point, galvanizing costs, production, and quality of the product.

Nails and small articles stick together in bunches in centrifugal galvanizing for two reasons: First, the temperature of the quench water, amount of articles dumped at one time, and methods of handling and quenching; and second, the metallic condition of the galvanizing bath.

Prime Western Zinc: Early zinc was mostly made from virgin ore, but after the first world war, the smelting of secondary materials such as galvanizer's dross, and other galvanizer's materials became an important factor in the zinc supply market. The zincs made from zinc ores most all contained lead ores and cadmium ore in small quantities. Hence these metals also came down in the slab zinc. In order to avoid selling lead at zinc prices, for at that time lead cost less than zinc, a provision was inserted in slab-zinc specifications that the lead content must not exceed 1.60 per cent in Prime Western zinc, the standard metal for hot-dip galvanizing. No lower limit for lead was set then, or has been set since.

With the increase in all kinds of galvanizing the amount of by-products produced began to reach such high proportions that smelting them to recover the zinc slowly became a major factor in the zinc supply market. Galvanizer's dross does not contain any appreciable amounts of lead or cadmium. So even with this difference in actual chemical character of the zinc, this metal still answers the full requirements of the A. S. T. M. Standard Specifications for Prime Western zinc for galvanizing, namely, that it must not contain over 1.60 lead content and not over 0.08 per cent iron content. Nothing is said about a low limit for lead, or about any cadmium content.

Many galvanizing troubles are traced to the galvanizing bath not having any lead in it, nor any lead in the bottom of the pot. Dross production has greatly increased; and when only zinc without any lead content is used, especially with a high-aluminum content of the bath, and no cadmium, tin, or other metals to thin out the bath, the metal becomes thick and sluggish, freezes quickly, creates enormous quantities of dross, develops many different types of coating troubles depending upon the field of galvanizing and the articles galvanized.

Centrifuge Work: In hot-dip galvanizing nails and small articles with a centrifuge, the fluidity of the metal plays an important part. For example, a galvanizer found it impossible to galvanize with a bath temperature under 95° F. Lowering the bath temperature resulted in a heavy finish, rough work, and articles sticking together. Because of the use of Prime Western zinc and the large amount of dross, the pot eventually burned out.

However, with the installation of the new pot new zinc was charged carried up to 1.00 per cent lead and from about 0.10 to 0.25 per cent cadmium. The new zinc was fluid, the bath temperature never exceeded 875° F, and the work had a bright finish. With old metal practice from ten to fifteen 100-lb kegs were

(*Please turn to Page* 125)

UMBER 8 IN A SERIES OUTLINING McKEE SERVICES TO THE IRON AND STEEL INDUSTRY IN RECENT YEARS

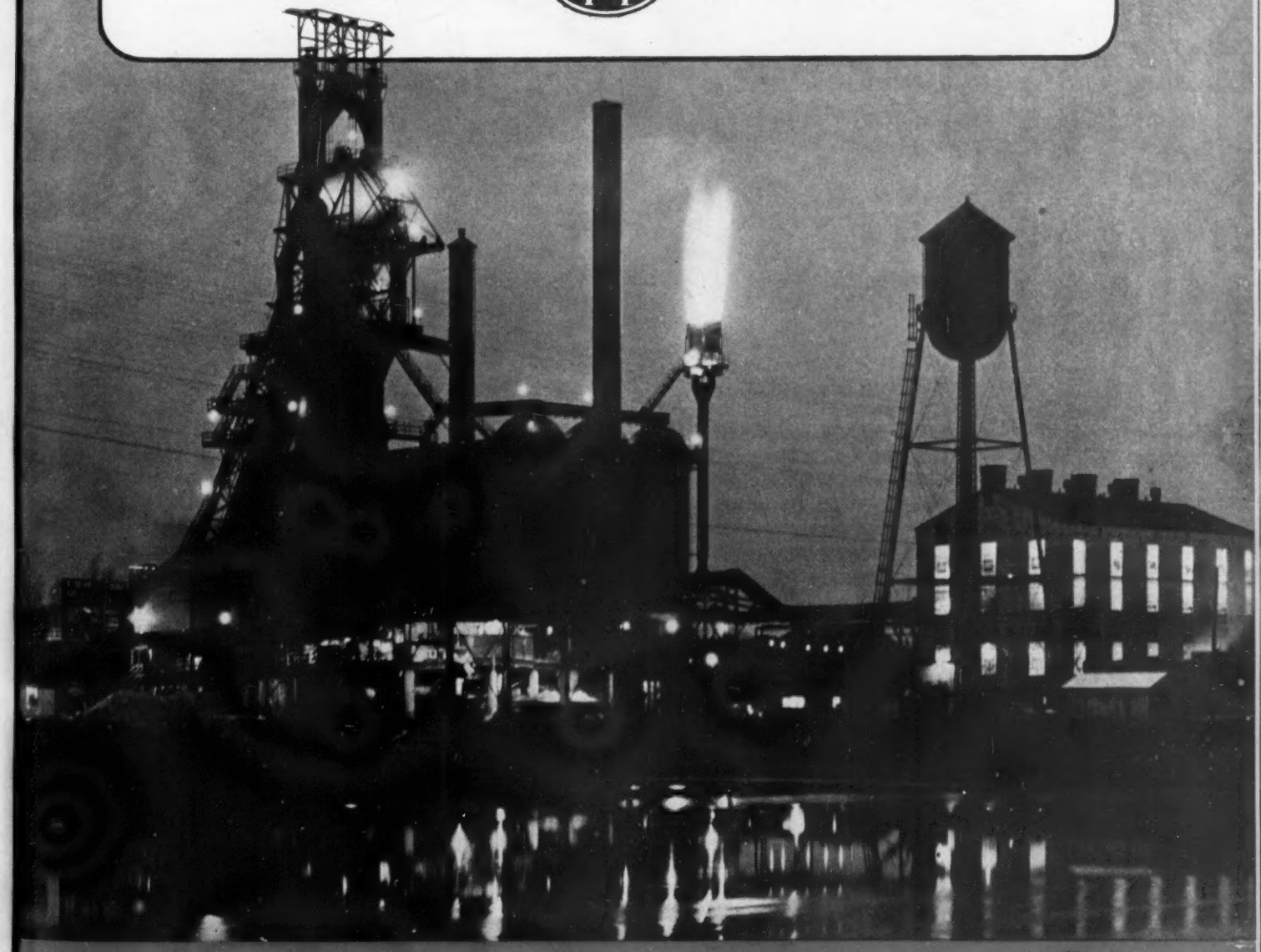
BLAST FURNACES

IN 1936 America's pig-iron producing capacity was approximately 55 million net tons annually. In the following 10 years this capacity was increased by 12 million to over 67 million net tons.

The position of Arthur G. McKee & Company in iron and steel plant engineering is clearly indicated by the fact that this organization was responsible during the past 10 years for new facilities with an annual capacity of over 7½ million net tons which is over 60% of America's increased capacity.

In addition to this added capacity, the McKee organization was responsible for rebuilt facilities accounting for hundreds of thousands of net tons of annual capacity.

This increased pig-iron producing capacity resulting from McKee activities since 1936 was no small factor in America's ability to wage a successful war on all fronts.



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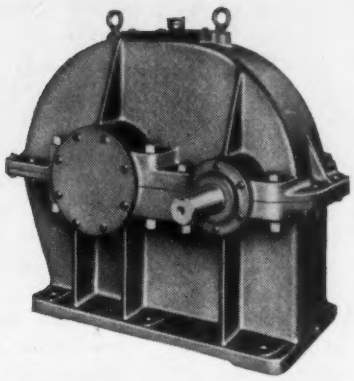

This Type SH speed reducer is a single-reduction unit which is furnished in thirteen standard ratios in each of twelve sizes. The Type DH speed reducer, which is a double-reduction unit, is offered in fifteen standard ratios in each of twelve sizes.

If your machines are among the four out of five that run slower than their prime movers, here are six ways you can profit by using Westinghouse speed reducers:

1. Improved power efficiency (one plant raised it from 80.9% to 85.4%).
2. Fewer inspections . . . only semiannual lubrication needed.
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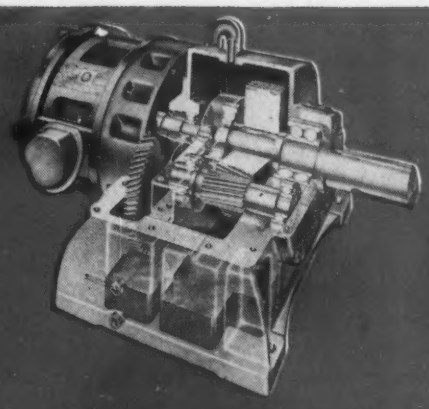
4. Long service life through single helical gearing, specially heat-treated by exclusive Westinghouse BPT process.
5. Minimum power loss with antifriction bearings.
6. Precision operation from hot-cut gears.

Add to these benefits the advantage of unit responsibility with both motors and gear supplied by one manufacturer. You have your choice of twenty-four sizes of Westinghouse speed reducers—Types SH and DH—for drives up to 1,000 hp with speed reduction ratios of 2.82 to 70.5.

Write, wire or telephone to your nearest Westinghouse office today, for full information on the application of speed reducers to your own drives. Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Penna. J-07252



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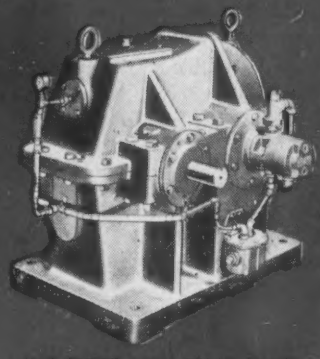

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These Westinghouse Type SU units are specially designed for high-speed duty in speed increasing services for pumps, compressors and similar applications. Units are available in 30 sizes—with gear ratios from 1.25 to 3.25 up to 2 to 12.

You'll find all the facts on industrial geared drives in this new, picture-packed book. Ask for your copy of B-3730 today, on your business letterhead, please.

Westinghouse

PLANTS IN 25 CITIES . . . OFFICES EVERYWHERE

4 out of 5 drives need speed reduction

Thermocouple Leadwires

(*Continued from Page* 91)

When extension leadwires are used (as they are in practically all pyrometer installations today) they become a part of the thermoelectric circuit and the thermocouple actually consists of the extension leadwires plus the thermocouple itself. Hence, the thermoelectric characteristics of the metals used in the extension leadwires are as vital as those of the thermocouple proper. Proper protection of the extension leadwire is of great importance since it is not generally an expendable part of the installation and frequently costs as much as, or more, than the thermocouples and instruments combined.

In all instances, choice, layout and installation of leadwires are important and these factors become increasingly so as the numbers and lengths of the leadwires necessary to an installation become greater. In installations, such as brick yards, engine testing laboratories, steel mills, blast furnaces, and coke ovens, where extension leadwires are used under wide ambient temperature conditions and subject to many deleterious factors, such as weather, corrosive atmospheres and the like, the possibility of future maintenance difficulties and operational inaccuracies are multiplied.

Inasmuch as the emf generated by a thermocouple is, at the most, only about 50 millivolts (0.050 volts), very minute leakage or galvanic action can produce serious inaccuracies in the temperature indications by changing the emf applied to the instrument. Therefore, the moisture-resistant qualities of insulation, which guard against the possibilities of leakage or galvanic action, are primary factors to consider. The weather, heat, and corrosive atmosphere resistant qualities are of equal importance in forestalling leakage, direct shorts, and grounds.

An example of the costliness of the loss entailed when insufficient consideration is given to the insulation qualities of thermocouple leadwires was seen in a large installation in the Gulf region. The instrument manufacturer's recommendation as to the type of leadwire insulation specifically required for this installation was disregarded and a type of insulation selected by the customer's engineer was used. After the installation was completed and the instrument system was put in operation, it was found that considerable inaccuracies existed in the temperature indications of the instruments. The erroneous indications became progressively worse until the entire system was useless.

Extension Leads at Fault

After it had been determined that neither the instrument nor the various thermocouples were at fault, it became obvious that the trouble lay in the concealed extension leads. Diligent searching and testing revealed the fact that the high humidity prevalent in the Gulf region had introduced moisture into the insulation of the extension leads. As a result, the insulation impregnant became an electrolyte when wet and a galvanic effect was produced between the two dissimilar metals comprising the conductors. Inasmuch as the extension leads were embedded in the building structure, it was a major operation to replace them. Consequently, a $200,000 loss resulted from the uselessness of the original leadwire installation, a loss which could easily have been avoided had the proper moisture-resistant insulation been used, as originally recommended.

Where process control is dependent upon the consistent operation of the thermocouple system, the importance of leadwires is multiplied because the product quality and production is in jeopardy if leadwire troubles should arise. As a general rule, in industrial processes, heat and dryness no less than moisture, are potentially dangerous factors. Heat will dry some insulations so that they become brittle, highly absorbent, or actually destroyed. It must be borne in mind that leakages and similar effects, which would be inconsequential at higher voltages, such as 110 volts, or even at one volt, produce serious errors in the minute voltages common to thermocouple circuits. The technical aspects of extension leadwires can be divided into two general parts: Wire, and insulation. The considerations for each in relation to a specific installation are entirely independent of one another. Therefore, by fulfilling the requirements as to the type of wire and the type of insulation, the proper extension leads for the specific case at hand can be ascertained.

As was previously stated, the emf developed by a thermocouple is determined by the temperature differential between the hot and cold junctions of the thermocouple. Since the extension leadwires are intended to extend the cold junction point to the end of the extension leadwires, they must have thermoelectric characteristics which conform to those of the actual thermocouple wires. Otherwise, at the junctures between the actual thermocouple wires and the extension leads, there would be a thermoelectric effect which would result in erroneous readings.

While in most cases the same metals

TABLE I
COMMONLY USED THERMOCOUPLES

Thermocouple	Available Sizes
Iron-Constantan (IC)	14-gage solid conductors, 16-gage solid or stranded conductors consisting of a positive conductor of iron and a negative conductor of constantan.
Chromel-Alumel (MA)	15-gage solid conductor, 16-gage solid or stranded conductors consisting of a positive conductor of copper and a negative conductor of constantan. Also, 14-gage solid conductors consisting of a positive conductor of chromel and a negative conductor of alumel. Copper-constantan leadwire, is used for installations involving thermocouple terminal head temperature up to about 250° F. Above this temperature, the relationship between the temperature and the developed emf for copper-constantan becomes increasingly different from that of chromel-alumel, thus making it necessary to use chromel-alumel combination to avoid serious errors in the temperature indications.
Platinum-Platinum Rhodium (QR or HER)	16-gage solid or stranded conductors consisting of a positive conductor of copper and a negative conductor made of a special alloy. (Lead-wires of the special alloy and copper were developed to be equivalent in their thermoelectric characteristics with Platinum-Platinum Rhodium. This was necessary inasmuch as Platinum is a noble metal and consequently quite costly.)
Copper-Constantan (CC)	20-gage conductors consisting of a positive conductor of copper and a negative conductor of constantan.

TABLE II
TYPES OF INSULATION

Insulating Material	Characteristics
Polyvinyl Thermoplastic	General purpose insulation for use in temperature conditions under 140° F. This insulation is greatly resistant to deterioration and moisture.
Felted, wax-impregnated, asbestos	High temperature, flame and moisture-resistant insulation. Used generally where the temperature ranges from 140° F to 400° F. The asbestos, impregnated with a flame and moisture-proof wax, forms an insulation suitable for installations wherein flames, steam, and high temperatures are encountered. It also has considerable resistance to moisture.
Rubber	Flexible, moisture-resistant insulation. Generally used where flexibility is the paramount factor, such as for portable use, and where the temperature does not exceed 110° F.

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Why continue to let thirsty bearings eat into your profits? Independent experts agree that three drops of fluid lubricating oil out of every four fed to bearings drip away unused.

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The heavier grades of NON-FLUID OIL, specifically designed to replace greases, do not require the aid of frictional heat to feed, but lubricate instantly and positively. Bearings lubricated with NON-FLUID OIL run noticeably cooler than when ordinary grease is used, thus indicating that NON-FLUID OIL reduces friction to a minimum, with a resultant reduction in power consumption and minimum wear on bearings.

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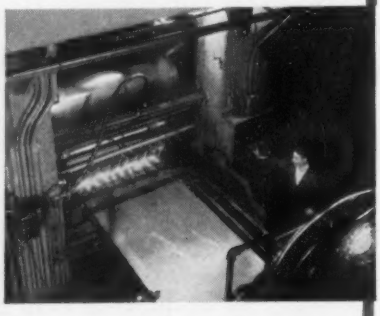

Characteristics and Technical Data: Color: gray. Finish: dull matte or bright polished. Viscosity: 20 seconds ± 4, #4 Ford cup initial; after five days, 35 seconds. Weight, gallon, 26.70 ± .5. Hardness: Rockwell at 5P measures 40B. Abrasion: excellent — 68,000 cycles Taber F10-1000 gm. load. Adhesion: excellent. Coverage: 400 square feet per gallon (approx.). Corrosion Resistance: salt spray treatment for 1,000 hours, no failure (estimated equivalent, 20 years in use). Weatherometer—3,600 hours, no failure. Film Properties: withstands air temperatures to 700° F. transient heat to 6300° F.

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are used for the thermocouple wires themselves, there are times when this is economically impractical. However, if the thermoelectric characteristics of the extension leadwires and those of the thermocouple itself conform, the same results are obtained, regardless of the materials used. For example, it is economically prohibitive and unnecessary to use platimum-platinum rhodium extension leadwires with a platinum-platinum rhodium (QR or HER) thermocouple. Consequently, a cheaper combination of metals (such as the copper-copper nickel used by Brown) whose thermoelectric characteristics conform within the required limits, is used to obtain entirely satisfactory results.

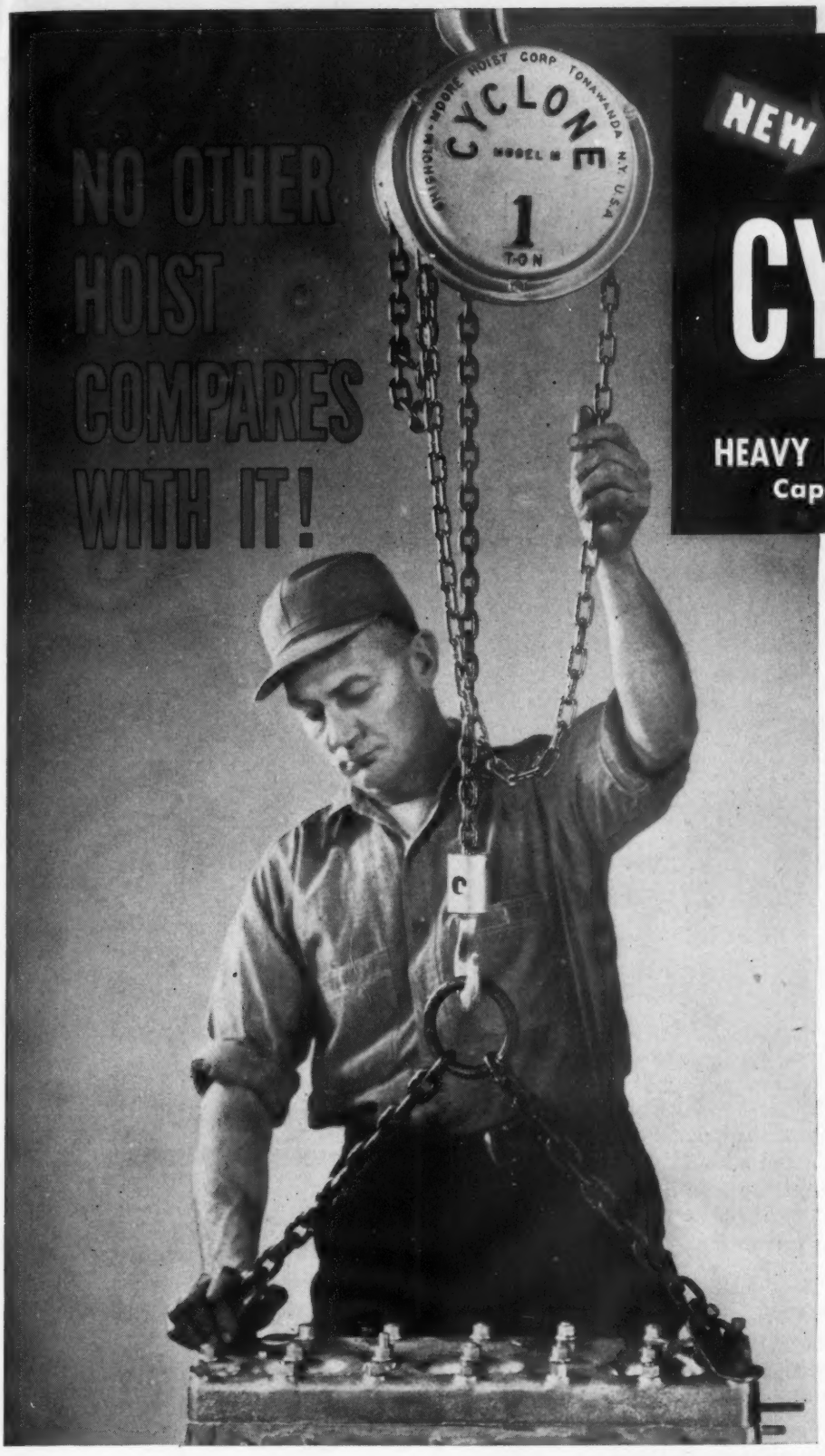
Effect of External Resistance

Insofar as the size or gage of wire is concerned, there is only one factor of relative importance to be considered, and that is the effect of external resistance upon the indicating instrument. Where the calibrated galvanometer (millivoltmeter) type of instrument is used, the resistance of the external leads should be as low as practical, especially where multiple measurements are made from thermocouples located at greatly varying distances from the instrument. Usually 14 B & S gage wire is used. Where the galvanometer actuated potentiometer type of instrument is used, somewhat smaller wire can generally be used since the degree of accuracy is not dependent upon the external resistance in the circuit. As a rule, 16 B & S gage wire is used. Where an instrument, such as the Brown Electronik, is used, external resistance has negligible effect upon its operative characteristics and extension leads as small or smaller than 20 B & S gage can be used.

For the majority of installations, solid conductor wire is used; however, where the thermocouple is moved from one application to another, necessitating flexible extension leadwires, the stranded type of conductor must be used in order to avoid frequent breakage.

Insulation surrounding the extension leadwire conductors must act not only as a dielectric (have high electrical resistance) between the two conductors and between the two conductors and ground, but must act as a protective covering to exclude the entrance or absorption of any deleterious materials which would give an unfavorable electrical reaction.

Primarily, the insulation must have good dielectric properties. It is of the utmost importance that the dielectric strength (insulating qualities) remain effective throughout any conditions of temperature, humidity, corrosive atmosphere, etc., to which the leadwires may



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HEAVY DUTY HIGH SPEED HOIST

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- **42% FEWER PARTS** simplifies maintenance
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- **Plus HERC-ALLOY CHAIN** America's First and Safest Steel Load Chain

The Cyclone Model M Heavy Duty Hoist is entirely new, completely different. Size and weight have been greatly reduced, and strength and durability greatly increased through the use of today's stronger alloys of steel and Alcoa aluminum. Efficiency and ease of operation have been increased to new high levels through the use of precision ball bearings at all rotating points. The many advantages of this unusual hoist are being demonstrated daily on-the-job by thousands of Cyclone Model M's already in service. *Ask your distributor* to show it to you.

● **New type load brake gives smooth, positive control at all times... exceptionally valuable in spotting or assembly work. Famous CM "Herc-Alloy" double duty alloy steel load chain is standard equipment on all models. The 1-ton model weighs only 35 pounds, has a minimum headroom of only 13⅜".**

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You can rely fully on Mansil Die Steel in forging, machining, grinding and heat treatment. It can be annealed very soft with the carbides spheroidized for good machinability. Upon correct heat treatment this structure changes to a fine martensite; the fracture grain also will be fine, ranging from 9 to 10 Shepard.

Use Mansil Die Steel for work requiring minimum distortion. Use it for cutting, blanking and forming dies and for many other applications where a tool steel of exceptionally high quality is needed.

ANALYSIS

Carbon	.90%
Manganese	1.15%
Chromium	.50%
Tungsten	.50%

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be subjected. For this reason, various kinds of material are used for insulation, the choice of which is determined by the condition prevalent at some particular insulation. For example, it is often necessary for the extension leadwire insulation to withstand weathering in such open air installations as brick or coke ovens. In such cases, the insulation must be able to withstand both excessive wetting and excessive baking by the sun without any serious deterioration in the dielectric strength of the insulation. In installations where the leadwire is not subject to weather deterioration, other detrimental conditions, such as steam, flame, corrosive atmosphere, and heat must be considered insofar as the insulation is concerned, and an insulation capable of withstanding these conditions selected.

Three Layers of Insulation

Examination of a piece of leadwire shows that there are two or sometimes three layers of insulation. Insulation directly around the conductors is a protective covering with a high dielectric strength and provides the primary electrical insulation. The outer insulation binds the two conductors into cable form and furnishes electrical isolation from the conduit or ground and mechanical and chemical protection. Both the inner and the outer insulations should be of a material which is resistant to both physical and chemical deterioration so that the dielectric properties of the leadwire remain effective. This is especially important in installations where it is difficult to replace the leadwire if trouble should develop.

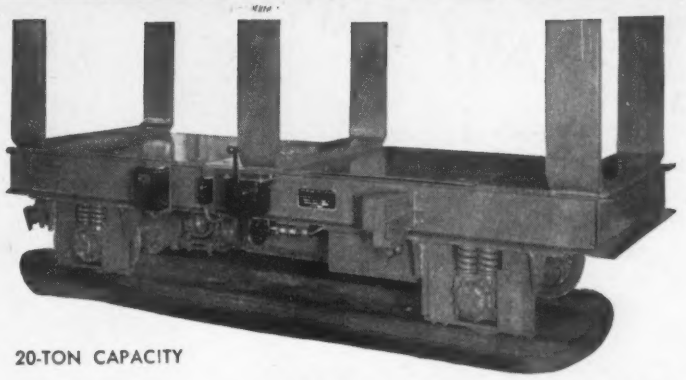
To protect the extension leadwires from mechanical wear and tear, when necessary, a metal protection is used. This is generally in the form of either iron or steel conduit or it may be a lead sheath.

The use of lead sheath is desirable in installations where excessive moisture or corrosive atmosphere is encountered. The use of conduit is requisite when there is danger of mechanical abrasion or penetration which could result in the destruction of the insulation.

Extension leadwire supplied by Brown is available both in different kinds of insulation and in different metal conductors. In this way, extension leadwire with thermoelectric properties to conform to any thermocouple and with insulation to fit any installation condition is available. Table I lists the most commonly used thermocouples and sizes of the extension leadwire which are supplied. These conductors are available with different kinds of insulation, so that specific installation conditions can be met.

Not all conductors are available in all

ATLAS
INTRAPLANT HAULAGE
EQUIPMENT



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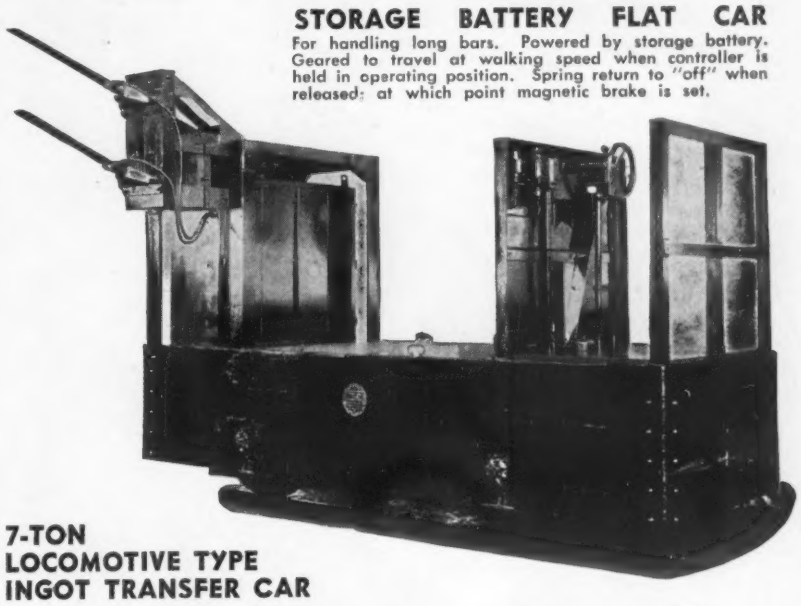

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LOCOMOTIVE TYPE
INGOT TRANSFER CAR

Operator station in elevated position at one end of car with magnetic switch control located opposite end. Car is provided with hydraulic brake system with anti-friction roller bearing—spring mounted journals.

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types of insulation, inasmuch as industrial requirements are such that each particular type of thermocouple will not be used subject to all conditions of exposure. Table II gives the types of insulations available together with the general conditions under which they should be used.

It is essential that the polarity be observed in connection extension leadwire; that supplied by Brown has the electrical polarity of each conductor identified by a color. The negative conductor can always be identified by its red coding; positive conductor is colored so as to not only identify its polarity, but the thermal characteristics as well. As in the insulation around the individual conductors, the outer insulation is color-coded. The color of outside insulation of the leadwire serves to identify its thermoelectric characteristics (i.e., with which thermocouple it is used, etc.).

Proper Installation Important

Proper installation of the extension leadwires is of no less importance than the wire itself in the attainment of accurate pyrometer readings over long periods of service. Many failures and inaccuracies in pyrometer systems have been the result of poor electrical connections and grounded wiring. There are but a few rules to be followed in making a proper installation. Whenever possible, the leadwires should be run in conduit to protect them against the possibility of mechanical injury. All necessary splices must be soldered, wrapped first with rubber tape, and then with friction tape.

It is extremely important that the polarity markings throughout the wiring between the thermocouple and the indicating instrument be followed and that they be connected in the proper polarity at all terminals. Observance of these simple rules for the wiring of the pyrometer system not only assures accurate results, but dependable service.

Use of improper leadwire or the possibility of improperly installed leadwires impairs both the accuracy of the temperature indication and the control of the process variable. The effect of wide variations in ambient temperature becomes a serious detriment in obtaining accurate indications unless the proper extension leadwire is used. Careless wiring, poorly soldered or unsoldered splices, carelessly taped splices or mechanical abrasion of the leadwire insulation can result in either complete or partial failure of the pyrometer system. However, the selection of the proper kind of leadwire, and careful adherance to the few simple rules necessary for a good extension leadwire wiring job, will result not only in accurate measurement and control, but an ultimate saving in maintenance and repair.

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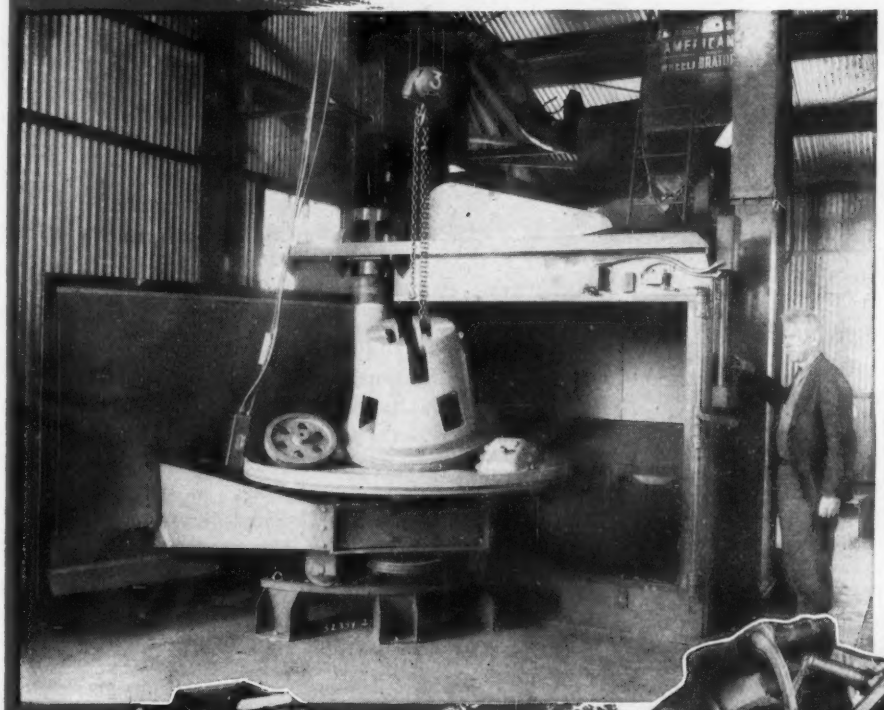
Handle Airblast Room Jobs Faster and Cheaper

Cleaning work in an Airblast room is usually slow, expensive and unhygienic. To overcome these handicaps American invented the Wheelabrator Swing Table—a multi-purpose machine whose fast, economical performance has been proved in more than a hundred installations.

The Swing Table provides the greatest convenience in handling work both inside and outside the cleaning chamber; it eliminates much of the manual labor ordinarily required in airblast room operation; it provides positive exposure of the work to the blast; it eliminates the handicap of wearing protective clothing; it serves admirably as a general purpose unit for the shop requiring a single, moderately priced machine capable of handling work of a wide variety of shapes, sizes and weights.

Opening the door of the machine brings the work table into position for loading or unloading . . . closing the door brings the rotating table beneath the blast of one or more airless Wheelabrator units so that all surfaces and cored areas are scoured to a bright, clean finish.

Write us today for the complete story on how this popular new machine can be profitably applied to YOUR individual cleaning problems.



Swing Tables are used in plants like these

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Honing and Lapping

(*Concluded from Page* 88)

being developed to deal with shapes other than round. Like broaching also, it now is being expanded in usefulness to deal with external round and other shapes and flats. In those fields it has only attained a start. It has far to go in every direction. It is one of the methods of machine shop practice most worth watching and least worth ignoring.

And now a word about lapping, a term which I believe came from the word "lapidary" which according to the dictionary "pertains to stones and to the working of stones". That very well could be, as modern lapping machines are very closely related to those stone working machines which true and finish marble, granite, etc. by cast iron "wabble plates" charged with sharp sand and water.

That is the basic principle of mechanized lapping. A true plane—usually a cast iron plate something like a serrated surface plate—is "charged" with abrasive such as diamond dust, or is "flowed" with a mixture of fine abrasive and oil. This plate is run upon the work with a wabbling motion to reduce the minute hills and valleys left by previous machining. Ordinarily, no more than 0.0002 to 0.0005-in. should be left for final removal by lapping. It is not a profitable way to remove excess material —only the tiny humps.

Lapping used to be confined to tool work such as final finishing of plug, ring and thread gages. Also, it was the final technique by which true planes were and are produced by "lapping together" three surface plates—the first with the second, the first with the third, the third with the second, and so on until the ultimate is attained.

With the advent of mechanized lapping and artificial abrasives, this technique—like honing—has graduated into industry. A number of companies, including the Norton Co. now build lapping machines which will handle both flat and round work to commercial limits formerly associated only with gage work. In the Norton vertical spindle lapping machines, bonded abrasive wheels—upper and lower—are used as laps. These rotate in opposite directions, the upper one floating. Speeds are between 600 and 700 surface feet per minute.

For example, in the plant of W. H. Nichols & Sons, Waltham, Mass., I have seen quantities of work on rayon pumps, etc., being carried through to tolerances of plus-or-minus 0.000025-in., enabling assembly of these fine mechanisms without preselection and maintenance of running fits requiring no packings.

Some of the Nichols lapping operations which make this sort of thing possible are carried out in special machines developed by that company. Others are done in standard machines. For example, I saw many parts being handled in Norton lappers under timed conditions. Incidentally, the Nichols shop has the finest setup of instrumentation that I have seen anywhere. Naturally the finest is none too good to check such limits.

As an example of lapping, I have used a photograph of a simple, ingenious and unusual setup which I came across at the Aetna-Standard plant in Ellwood City, Pa., during the war. This photograph, in the upper left hand corner of the first page of this article, shows the lapping together of the ball and socket members of a huge ball-and-socket joint previously form-turned and form-bored by special lathe attachments.

The lapping was done by mounting the socket member on the table of a vertical turret lathe and mounting the ball members in a floating support on the turret. Coating the work with fine abrasive and oil, the table was revolved slowly while the operator "wabbled" the nonrevolving ball by means of the lever he is holding in his left hand. The two were neatly lapped together in a short space of time by this method and true spherical seating was attained.

The Superfinishing Method

Related both to honing and to lapping as far as results are concerned, but differing from both in operational methods, is a third technique widely known and widely used today under the coined name of "Superfinishing." The technical and promotional genius responsible for this technique is none other than David A. Wallace, president, Chrysler Division, Chrysler Corp. Here is the basic story in the words of Mr. Wallace himself.

"Metallic surface finishing basically is a metallurgical problem. Superfinishing is the removal from the surface of a dimensionally finished metal part, of the *fragmented* metal resulting from turning, grinding, honing and lapping—at which final operation dimensional accuracy and fine finish are attained simultaneously.

"Mechanically, this surface is metallurgically changed from a fragmented surface of ruptured metal to a surface of smooth, unworked crystalline metal capable of carrying greater bearing loads per unit area with either total or practically total wear-elimination — when properly lubricated. Yet there is removed from the surface a layer of fragmented metal which ordinarily is less than 0.0001-in. thick."

In brief, this interesting result is attained by mechanical "scrubbing" of the surface of the work by resinoid-bonded abrasive sticks at speeds above that of honing and lapping but lower than grinding. A patented method of guidance has been developed by which no single grain ever retraces its previous path—this being achieved by ingenious compound motions of stones and work. Surfaces perfect in quality within 1 microinch (a "millionth") thus are attained commercially.

On the second page of this article is a machine for the mass-superfinishing of Chrysler pistons. This was built by the Foster Machine Co., now a division of the Gisholt Machine Co., and is typical of the industrial application of this method. The technique is covered in great detail in a book entitled "The Story of Superfinish," by Arthur M. Swigert, Jr. (Lynn Publishing Co., Detroit). That book is highly interesting as well as informative.

At the lower right of the first page of this article, appears a picture of a device of importance in honing, lapping and Superfinishing—in that it removes the metallic (iron or steel) refuse from the lubricant or compound used in connection with these operations. This Barnes Drill Co. cleaner employs a drum containing powerful magnets to pick up the undesirable particles from the compound. They stand up like clumps of grass and are removed by a scraper.

No article on honing, lapping and Superfinishing would be complete without mention of the methods by which surfaces true to "millionths" are evaluated. That is where the scientists come in. On the third page of this article appears a portable type of Profilometer made by Physicists Research Co., Ann Arbor, Mich., in use measuring surface quality of a Superfinished Chrysler crankshaft. A point of extreme sharpness "feels" the surface and reports its finding electrically on dials on top of the box. Are "microinches" beyond human sensory perceptions? Not if one can believe the craftsmen who "feel" them through teeth or finger nails. I have seen it done —and accurately too!

This is the final article of this series. It merely scratches the surface of matters of mechanical finishing to exacting limits about which I know very little and about which the average engineer and shop man knows very little. At one end of the scale we have the rapid removal of masses of metal by supermilling, etc. At the other end of the scale we have controlled removal of minute layers by honing, lapping and Superfinishing. All these methods are in a state of rapid development. We are all going to know a lot more about all of them in the next few years—or we will fall by the wayside as Machine Shop Practice Marches On!

Rotorolled tubing
Rotorolled tubing is a cold worked product. The machines pictured here are used to produce Timken Rotorolled Seamless Tubing from ½" to 3⅛" O.D. with exceptionally close wall tolerances and a smooth finished surface. This method of cold working tubes also increases their machinability.
Tube and bar cutting
Pictured below are some of the cut-off machines operated in pairs. In addition to this equipment there are abrasive saws, cracker shears and circular saws. This equipment is capable of cutting bars and tubes from ½" to 10½" O.D. Shown at the top is a close-up of this operation.
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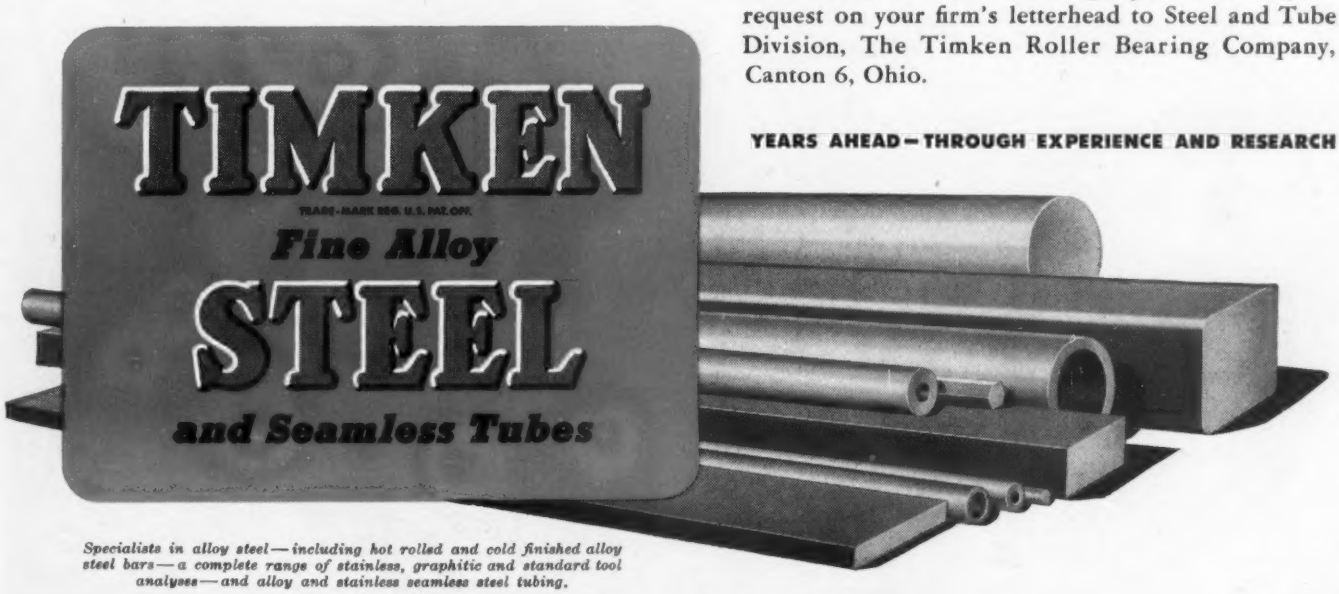

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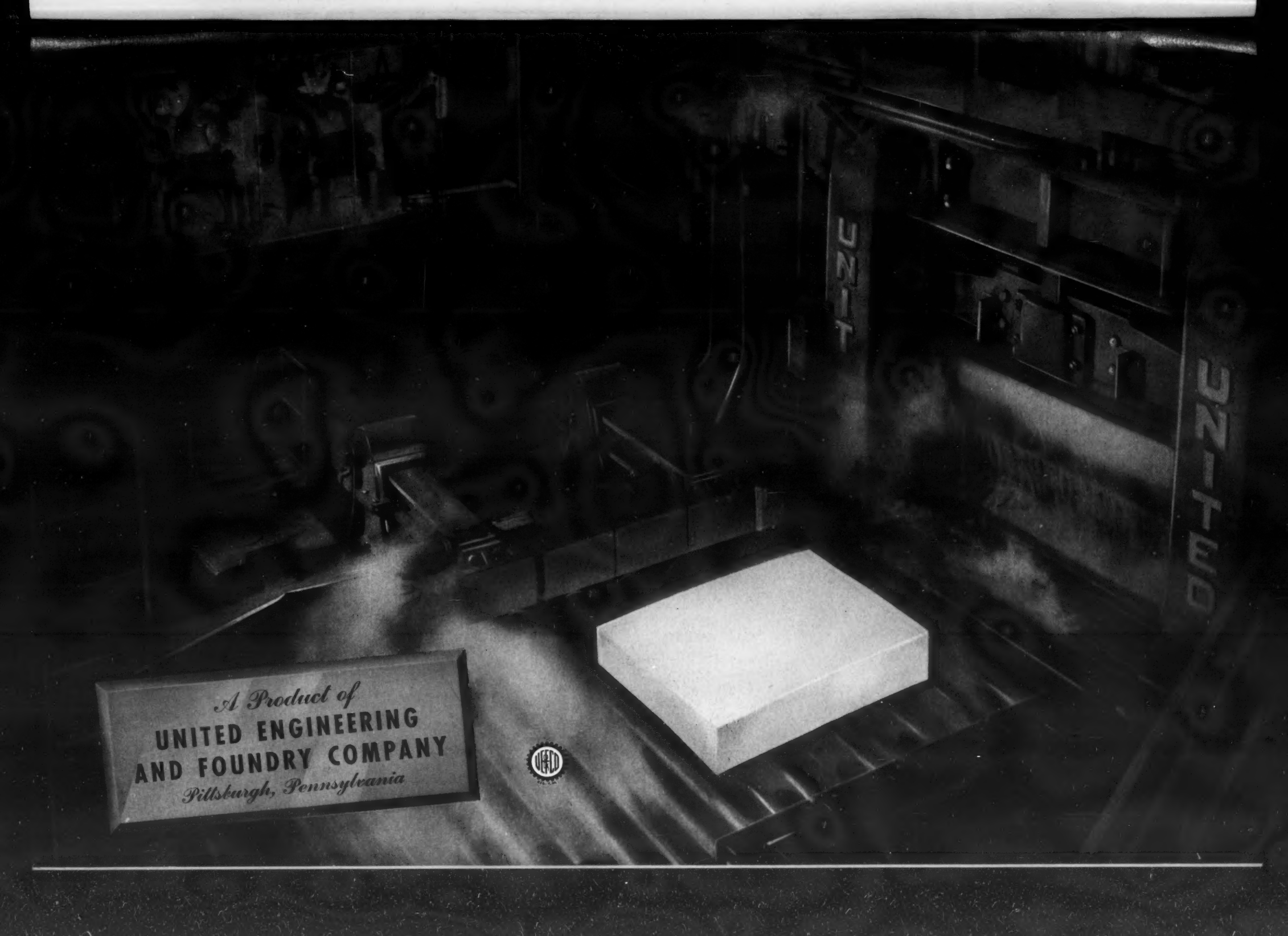
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Hot Dip Galvanizing

(*Continued from Page* 108)

filled with rejected articles. With new zinc and new bath conditions maximum rejections decreased to ½ keg daily, based on a day's production of 10,000 lb of work centrifuged.

Aluminum in the Bath: Modern Prime Western zincs carry only 0.05 per cent lead, and there is a gradual tendency for the bath to build up troublesome and costly conditions. If any lead has accumulated in the bottom of the pot when this grade of zinc is first used, it will be taken up of its own accord, since the lead content is about 1.50 to 2.00 per cent depending on the bath temperature.

These conditions, which aggravate the formation of oxide scum over the bath surface, require more aluminum additions to keep the surface clear and to give a smooth coating free of any scruf, dirt and oxide. A crude illustration would be to say the metal fluidity resembles laying sandbags against the pot side instead of having a fluid bath like water to convey away the heat. The heat builds up, the bath thickness increases, more aluminum is added, the iron increases rapidly, and dross forms at accelerating rates.

Sticking: At first the work begins to get rough and the coating looks dull. As conditions grow worse the finish becomes almost a wrinkled finish, and the nails start to stick together because the metal has started to freeze them in bunches before they even get into the centrifuge. The trouble is accumulative with ever-increasing iron, requiring more aluminum additions, and finally everything comes to a standstill.

It does not make any difference whether the condition is slowly developed due to a zinc that does not carry any lead, or extremely low lead; or, whether it is without much lead, and high in aluminum. Results are the same—high dross, chunks of work sticking together, and high bath temperature. The latter which eventually means early pot failure with a heavy deposit of dross in the pot continually, and finally heavy metal deposit per ton of product, with an end result of such low quality that the work is not saleable, making it necessary to stop operations entirely. When this point arrives the cost of getting back to normal is high, especially if the procedure has gone far enough to burn out the pot. The remedy is costly even if the pot has not been destroyed.

Cause and Remedy: Since aluminum additions are the cause of the thick bath, in addition to not being able to perhaps even get a flux on the bath, the first thing is to eliminate its use entirely, and for at least a short time swing over to another brand of zinc that carries lead up to 1.0 per cent, with or without some cadmium. To get the cadmium content which is to replace the aluminum some intermediate brand of zinc carrying up to 0.50 per cent cadmium should be used.

The quickest way to get lead into the pot is to charge at least 2 inches of lead metal in pig form in the bath. Before the new brands of slab zinc can be added the iron in the form of dross is removed. If the bath temperature is around 900° F it is lowered to at least 860° F as soon as possible. A difference in the fluidity of the bath will be quickly noticed with the addition of the lead. Lead tends to lubricate zinc, give it more fluidity, thin out the bath, reduce dross, and develop a brighter finish due to the fact that a thinner bath will clear itself of oxides, scruf, and dirt better, thus giving the full benefit of the purer metal in a much brighter and cleaner finish.

Excess Aluminum: This will not only cause poor coating conditions and the articles to stick together in centrifuge practice, but it also disrupts smooth operations in other fields.

Some cities believed that lead fumes coming from galvanizing baths are harmful and have actually passed laws prohibiting the use of lead for this purpose. However, this is completely in error because no fumes of lead originate from galvanizing baths. This has definitely been proved by research investigations. Instead of metallic lead being harmful in galvanizing baths, it actually is beneficial.

Actual examples show that high aluminum in galvanizing baths creates havoc. On one occasion a large quantity of aluminum was added to the bath for the purpose of reducing dross. However, the chemical reactions that normally take place in fluxing to form zinc chloride, were now changed to form aluminum chloride gas because of excess aluminum. Thus as fast as new flux salt was put on the bath, it simply went up in smoke creating the worst kind of fume conditions and in the end all operations of two galvanizing pots had to be stopped, and the pots completely bailed out. There was not enough reserve metal on hand, with the result that the pots lost two weeks' production before they were filled and restored to normal operation.

Excess aluminum not only destroys normal fluxing operations, but it so thickens the bath that dross immediately is increased, and especially where there is no lead in the bath. Excess aluminum in one plant raised the production of oxide skimmings to 38 per cent; by eliminating aluminum skimmings were lowered 20 per cent. In field of range boiler and tank galvanizing excess aluminum may be noted by the heavy curtain effect of the drip metal all around the bottom draining edge. In the field of small work using the centrifuge excess aluminum causes the articles to have a dull, rough wrinkled finish, and to stick together.

Limits of Impurities: High limits for lead and iron have been set by the American Society of Testing Materials as 1.60 per cent lead and 0.08 per cent iron in slab zinc known as Prime Western grade. Research investigations and practical experience have demonstrated that lead

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is beneficial in zinc for galvanizing, and does not produce lead fumes as erroneously reported by some authorities. The low limit for lead content in zincs for galvanizing should range at 0.75 per cent and since the high limit is already set, a lead content from 0.75 to 1.25 per cent will be satisfactory. Cadmium used to replace aluminum can be 0.25 per cent. Copper reduces corrosion of zinc the same as it does in steel. It therefore is beneficial in zinc coatings in amounts up to 0.25 per cent.

Tin has been added to some galvanizing baths, and there is a difference of opinion as to its harmful effects above a certain value. The writer believes that a tin content with an upper limit of 1.00 per cent is not harmful for pails and tubs. However, in the field of hot water tanks investigations show that a tin content of over 1.00 per cent is harmful. It is therefore recommended in this field of galvanizing to eliminate tin and use cadmium as a thinner instead. A small amount of aluminum might be used, and if the spangle is not satisfactory extremely small amounts of tin could be added to open it up.

No set specifications can be given for any coating or slab zinc. It is believed that better results are obtained by purchasing metal by the chemical content rather than to simply buy Prime Western as a grade. If the Prime Western contains up to 1.00 per cent lead, or near that value, then that grade can be used, but Prime Western grade without lead, or low lead is not recommended.

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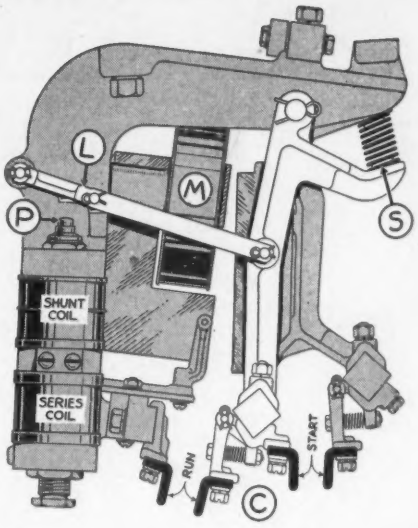

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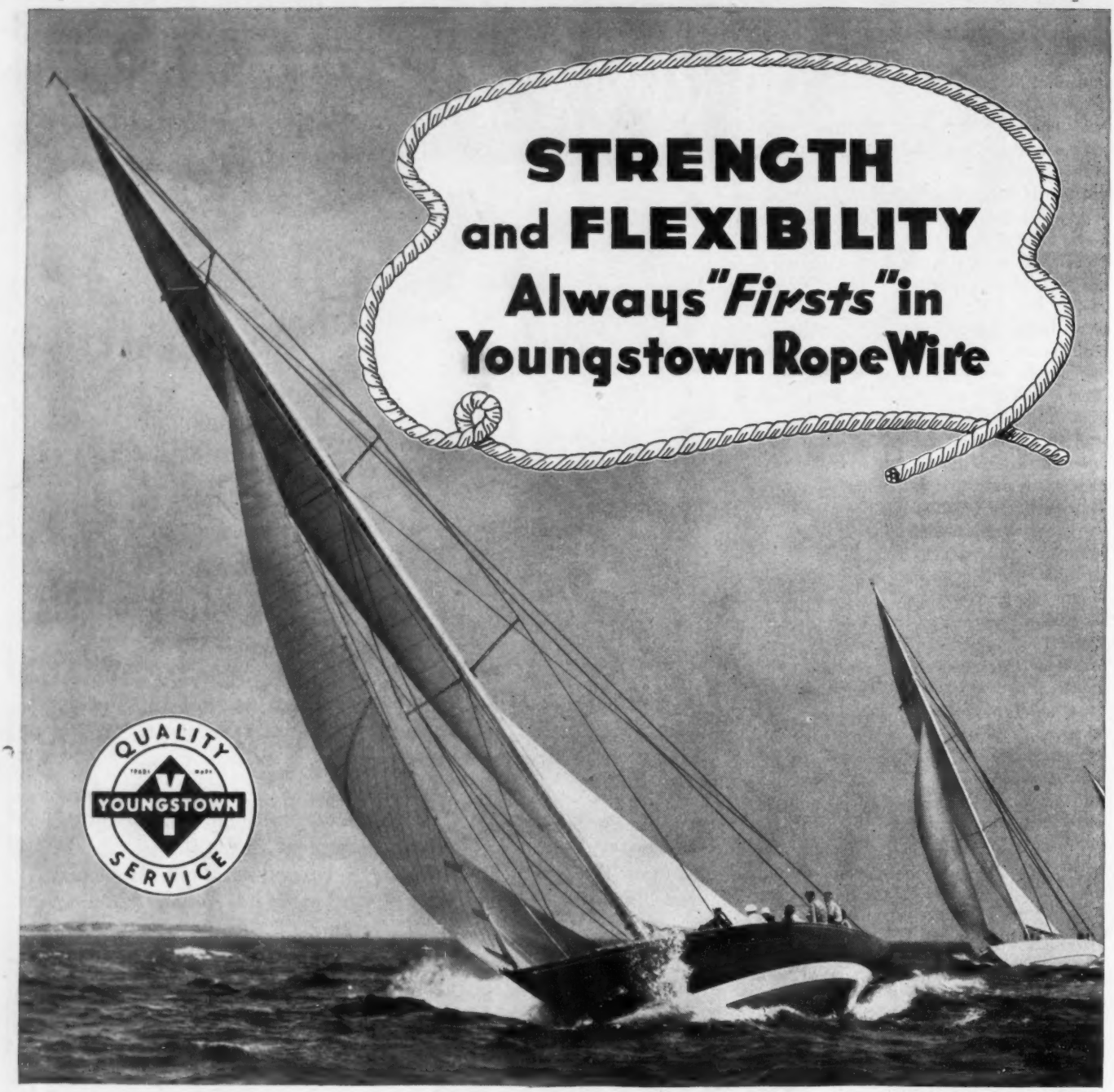

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Air Tools

(*Concluded from Page 90*)

as little loss in pressure as can be accomplished with one 6 and two 4-in. main trunk lines leading to the five floors. From these trunk lines the smaller piping, 1, ¾ and ½-in., through hundreds of openings, lead to the jobs, with rubber hose from the piping to the compressed air tools. An average of 5000 cfm of compressed air is used in the plant.

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Use of Induction Heating For Annealing Described

Annealing, softening, tempering or strain relieving small steel parts or sections of parts by use of high frequency induction heating is described in the U. S. Army research report on sale by Office of Technical Services, Department of Commerce, Washington. This type of heating makes it possible to change the physical properties of a section of a steel part without affecting the rest of the part, the report states.

In addition to enabling an operator to localize heat treatment, high frequency induction heating has the following advantages, according to the report: Reduces operating time because of high heating rate; produces uniform results; forms less scale on steel parts; uses equipment which needs no preheating, is easily integrated into production lines; and requires little training or skill to operate.

Designated as PB-49265, the report describes the successful use of high frequency heating in tempering thin rims of gages in order to prevent them from chipping, in tempering parts of hardened steel to make them wear resistant and in annealing steel lugs, shanks and large ends preparatory to machining.

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Proposed revision of Simplified Practice Recommendation R185-42, pipe fittings, has been approved for promulgation, according to National Bureau of Standards, Washington The revised recommendation, now known as R185-47, applies to gray cast iron, malleable iron and brass or bronze fittings.

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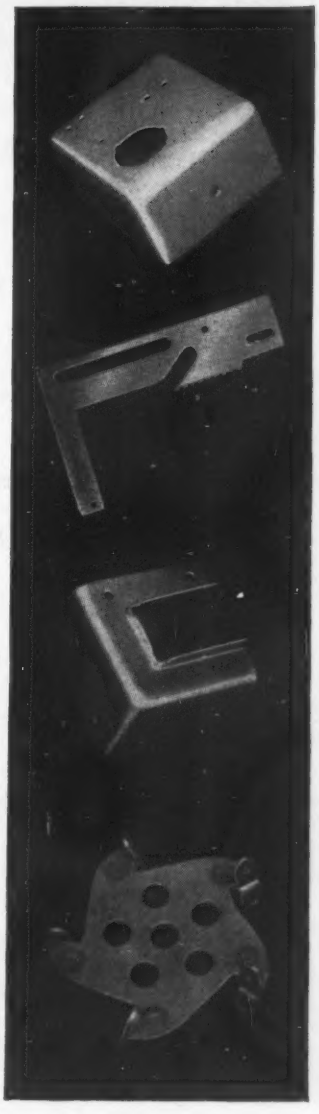

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(*Continued from Page* 98)

she closes the carton and places it in a shipping container.

With this arrangement, assembly and packaging keep step with production of sleeve castings on one machine and nut castings on another (or more than one) machine in another department. Some banks of nut castings or sleeve gates are built up at times and compensate for any delays for machine adjustments, but the whole setup is geared to rapid and efficient production.

Where split shields for lag screw expansion bolts are required, these are cast in four-to-twelve-cavity dies to produce gates such as those shown at *l* and *m* in Fig. 2 and in foreground of Fig. 7. On Kipcasters, a side gate is used but in the newer "Work-Horse" and Kux machines, a center gate is employed. Machines run, as a rule, 200 to 450 shots per hour. In the Star "Stazin" shield design, the shield assembly consists of two halves, one having a pair of ears and one a pair of mating notches into which the ears fit. Eared halves are all on one side of the central runner and notched halves on the opposite side. There are also on each runner one or two tapered pilot pins and mating tapered holes.

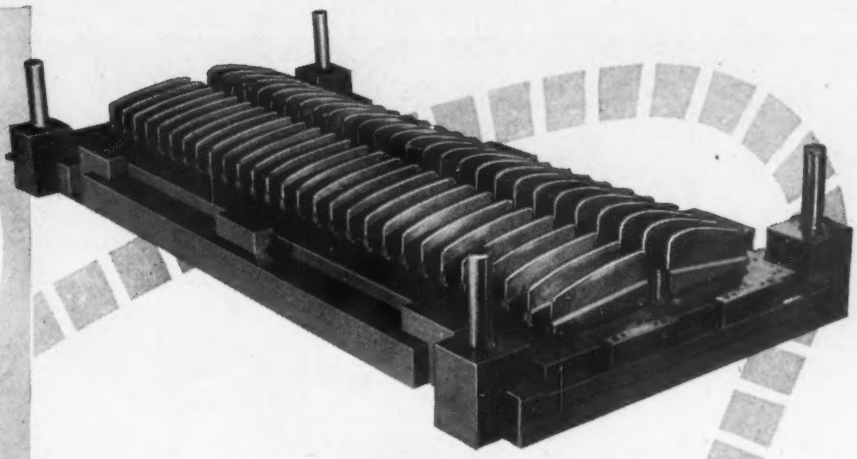
Cutting Off Sprue

With this arrangement, two gates of castings are laid face to face and the respective half shields then each register so that the ears on one half can be formed around the other half, as desired. Before this can be done, however, the sprue on one gate must be cut off. In the trimming setup, Fig. 7, there is room under the punch for three gates of shields. That at the operator's right (far side) comes only under a shear knife that cuts off the sprue. Then the gate, without the sprue, is laid in the trim die and another gate, with sprue still on, is laid thereon.

Each time the press is tripped, the die not only wraps the ears of four shields around the mating pairs but it also cuts the shields from the two gates and a sprue from a new gate placed at the right. The shields, now permanently fastened into pairs, fall into a tote box and runners and sprues are ejected into another box for return to the casting room. Some light flash still remains on the pairs of shields but this is broken off by tumbling the pairs in inclined barrels.

For machines producing shield castings with sprues at the center, as at *l*, Fig. 2, it is also necessary to cut off the sprue from one gate before assembling it to another gate for trimming. As this would cut the runner in half, it is necessary to cast a ring of metal around the

when you must maintain quality and still cut costs..



eventually the search leads to *SPEED TREAT*

Republic Aviation had a problem . . . how to build a quality all-metal plane, big enough to carry four people and baggage . . . at a price that would be attractively low. Today's amphibian Seabee was the answer, but it took unusual skill plus patience in determining materials and methods.

For example, the stiffening beads formed in the wing and tail skin-sheet sections eliminated numerous standard airframe members. Here Holliday *SPEED TREAT* provided a real economy. The die shown above for forming the beads, could have been costly. By using free machining fine-finish *SPEED TREAT* for the inserts total cost was surprisingly low.

For quality work at lower cost . . . in die and mold making or for parts that require considerable machining, remember Holliday *SPEED CASE* or *SPEED TREAT* steel plate. Let us give you the facts and you be the judge.

W. J. HOLLIDAY & CO., INC.

SPEED CASE – SPEED TREAT Plate Division

HAMMOND INDIANA

Plants at Hammond and Indianapolis, Indiana

SPEED CASE AND SPEED TREAT STEEL PLATES DISTRIBUTED FROM THESE WAREHOUSES IN ALL PLATES SIZES

AKRON 1, Ohio
The Burger Iron Company

BUFFALO 5, New York
Beals, McCarthy and Rogers

BOSTON 10, Massachusetts
Brown-Wales Company

DETROIT 7, Michigan
Peninsular Steel Co.

HOUSTON 1, Texas
Earle M. Jorgensen Co.

LOS ANGELES 54, California
Earle M. Jorgensen Co.

MEMPHIS 2, Tennessee
Pidgeon-Thomas Iron Co.

NEWARK 5, New Jersey
Grammer, Dempsey & Hudson

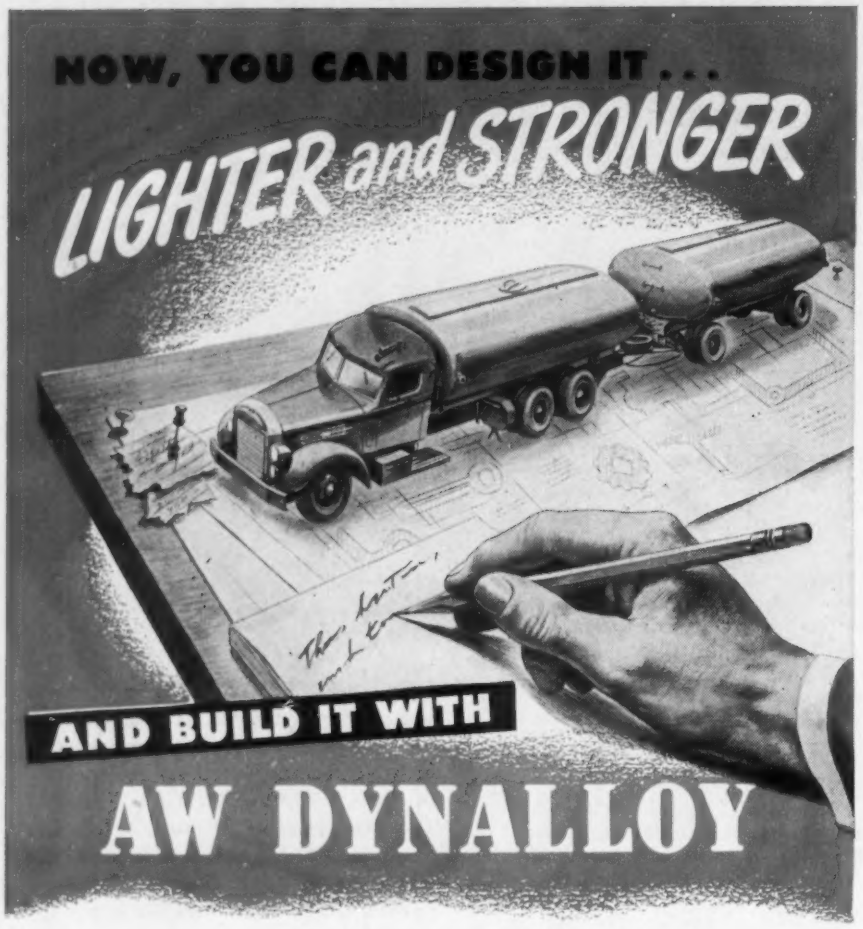
OAKLAND 7, California
Earle M. Jorgensen Co.

PHILADELPHIA 34, Penna.
Horace T. Potts Co.

CANADA: Toronto 2, Ontario, Peckover's, Ltd.

Holliday *SPEED TREAT* is a medium carbon, open hearth, free machining steel plate. One of the Seabee bead forming dies is shown above, with 56 inserts made of *SPEED TREAT*. Thomas Pryde of Pryde Tool & Die Company, well-known tool and die maker of St. Clair Shores, Michigan, worked closely with Republic in the design of the dies . . . and provided the completed die sets with *SPEED TREAT* inserts. The individual inserts were flame-cut from *SPEED TREAT* X-1545 plates, machined to size, and flame-hardened after installation in the die set.

W. J. HOLLIDAY & CO. 91 1856 YEARS of STEEL 1947



AW Dynalloy, Alan Wood's high strength low alloy steel, has opened a new era in light weight construction. With Dynalloy you can design extra strong structures or cut useless dead weight as much as 40% without reducing strength or safety. Intricate shapes and parts are easily produced with Dynalloy, for it has excellent cold forming properties. Dynalloy is especially recommended for the construction of trailer trucks, buses, freight cars, auto bodies and other vehicles which must carry large pay-loads and stoutly resist corrosion. (Dynalloy has 4 to 6 times the resistance to atmospheric corrosion as plain carbon steel or about twice that of copper bearing mild steel.) Dynalloy also has greater resistance to impact, abrasion and fatigue.

Get complete information about the many advantages of AW Dynalloy by writing for a copy of our new folder D 14. It gives maximum sizes, chemical composition, etc.

PHYSICAL PROPERTIES OF AW DYNALLOY

Yield Point P. S. I. Minimum	50,000
Tensile Strength P. S. I.	65-80,000
Elongation in 2", %, Minimum	25.0
*Elongation in 8", %, Minimum	1,500,000 T. S.
Endurance Limit P. S. I.	45,000
Specimen Cold Bend, 180° @diameter = 1 thickness	

*For material under 5/16" to 3/16" inclusive, deduct 1.25 per cent for each decrease of 1/32" below 5/16" from the percentage of elongation in 8" specified above.

AW DYNALLOY
THE HIGH STRENGTH LOW ALLOY STEEL
A Product of ALAN WOOD STEEL COMPANY
CONSHOHOCKEN, PENNA.

sprue so that the runner remains in one piece until the shield castings are cut off. Otherwise, separate trimming of two halves would be required.

For one-piece three-lobe shields, shown at *o* and *p*, Fig. 2, tapered (unthreaded) cores are used that also form the slots and that are pulled axially. This form of shield is used in combination with nuts that have three integral wedges cast on the outside to register with the slots. When the nut is pulled up, it spreads the shield so that it grips the sides of the hole in which it is inserted. Five of these nuts, each having a cast internal thread, are shown on the gate *q*, Fig. 2. Production of these nuts is accomplished in the same way as for the other internally threaded nuts already described.

Die Has Removable Cavity Blocks

Fig. 9 shows the die used for casting the four pairs of shields seen on the gate in the die (and also on gate *o*, Fig. 2) in the Kux machine. In this die, which has removable cavity blocks, each pair of shields is of different size which necessitates, of course, four pairs of cores correspondingly sized. Each pair of cores is mounted on a slide and each slide is moved outward automatically by a pin set at a 30-degree angle, as the die opens. This die produces about 160 gates of eight castings each per hour.

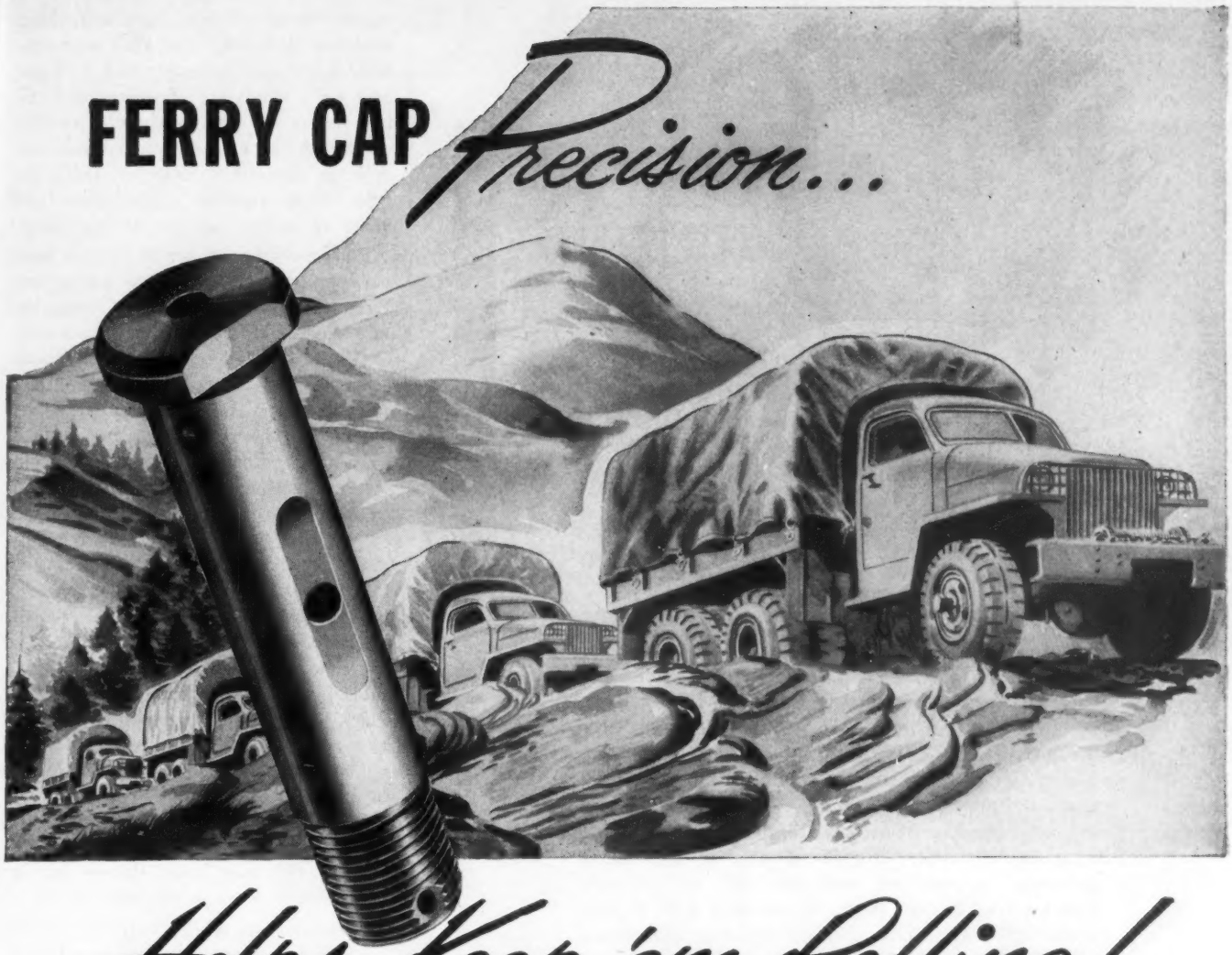
All zinc alloy casting machines are in one room on the ground floor well away from the casting rooms on the second floor where lead is cast. Special precautions are taken to see that no lead scrap reaches the zinc casting department because of the need for keeping lead content in the zinc alloy below the 0.007 per cent maximum imposed by standard specifications. A sample from each pot of zinc alloy is checked against contamination by use of an "Electropode" and this, in turn, is checked by spectrographic means by an outside laboratory.

Zinc sprues, gates and flash are remelted in a pot provided for this purpose and the melt is run into bar molds. Two of these bars of remelt to one of virgin metal are added as make up to pots at casting machines all of which are fired with propane gas controlled thermostatically to hold a substantially constant casting temperature.

Because of the small melting pots on the Work Horse machines, each of these is supplied with a supplementary pot of much larger capacity. This is connected to the smaller pot by a 2-in. pipe that is kept hot with a resistance coil under an insulating jacket. A positive pump is arranged to keep the small pot filled.

Soft lead anchors for use with wood screws that cut their own threads as they are applied are now being cast in per-

FERRY CAP *Precision...*



Helps Keep 'em Rolling!

● This Ferry Cap Spring Bolt is a vital part of the truck.

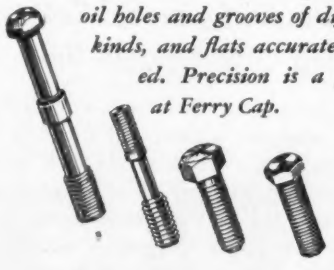
The truck manufacturer engineered the bolt; we made it with precision becoming the careful engineering.

The bolt has maximum ground surface wearing qualities. It is case hardened to proper depth, achieving a hard surface with a relatively soft core, assuring both long wear and high fatigue strength. The thread end is annealed to make it tough —more than equal to the required thread strength.

The bolt fits perfectly. The body is ground to close tolerance, oil holes expertly drilled, and flats milled to a smooth, true surface to allow free flow of lubricants. The cotter holes, accurately drilled, are free from burrs.

It is a spring bolt of which the truck manufacturer can well be proud—a clean-cut, precision-made, long-wearing, tough, dependable product.

This Ferry Cap Spring Bolt is one of hundreds of different designs which we make for leading truck manufacturers. We manufacture them to various head shapes, with oil holes and grooves of different kinds, and flats accurately milled. Precision is a principle at Ferry Cap.



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IF SO WE'D LIKE TO DISCUSS IT WITH YOU

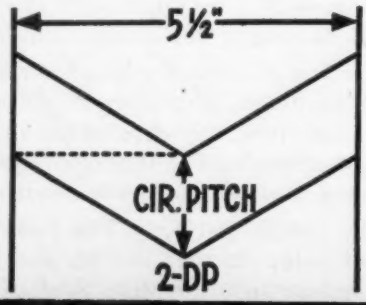
The FERRY CAP & SET SCREW Co.

2159 SCRANTON ROAD Dept. A-12 CLEVELAND 13, OHIO

Pioneers and Recognized Specialists, Cold Upset Screw Products since 1907

CAP AND SET SCREWS • CONNECTING ROD BOLTS • MAIN BEARING BOLTS • SPRING BOLTS AND SHACKLE BOLTS • HARDENED AND GROUND BOLTS • SPECIAL ALLOY STEEL SCREWS • VALVE TAPPET ADJUSTING SCREWS • AIRCRAFT ENGINE STUDS • ALLOY STEEL AND COMMERCIAL STUDS • FERRY PATENTED ACORN NUTS

Efficiency of OTTUMWA-Sykes generated continuous tooth herringbone gears is fully demonstrated by the action of the teeth. The continuous teeth, true involute, UTILIZE EVERY FRACTION OF FACE WIDTH, giving full bearing surface, creating the most economical and most efficient system yet devised for the transmission of power between shafts whose axes are parallel. The full benefit of the helical principle is obtained with the 30° helix angle. Overlapping of the teeth is obtained with a face width of only 10.88 divided by the diametrical pitch, so that wide faces in proportion to the pitch are now optional, not compulsory. OTTUMWA can furnish Sykes continuous tooth herringbone gears up to 10'2" dia., 24" face, and in all pitches up to 1¼ D. P., in steel or semi-steel. We also cut blanks furnished by our customers. Send us your inquiries. Our engineers will be glad to help you choose the right drive for your application.



ESTABLISHED 1867

OTTUMWA
IRON WORKS

ENGINEERS • FOUNDERS • MACHINISTS

OTTUMWA, IOWA, U. S. A.

manent metal molds under gravity head as shown in Fig. 8. The alloy used contains 3 per cent antimony and 0.35 per cent tin. Molds are of bronze and the two halves are hinged about a vertical pivot at the back of a machined iron bed. A lever operates a lock that holds the two halves together at the outer end while 12 anchors are cast at one filling.

Each mold has its set of 12 core pins, one per casting, and means for pulling these cores downward by a lever, before the mold is opened, is provided. Cores are lowered only enough to break them free of the castings. The gate rests loosely on the cores until lifted off by hand. The runner is a bar formed by a recess along the top of the mold and into this recess the metal is ladled by hand from the pot shown.

One man, handling three molds in rotation, produces 60 to 70 gates of castings per hour and transfers these to tote pans which are shifted on a roller conveyor to trim stations outside the casting room. There, castings are cut from gates by a shearing knife, as shown in Fig. 10. The knife, normally covered by a transparent housing (removed to facilitate photographing), cuts off six castings at a time and they slide down an incline into a carton. Then the gate is reversed and the other six castings are cut off, the gate being thrown into a tote box for return to the melting pot.

Shear shown is operated by a foot controlled solenoid, others are operated by power presses. After filling the carton with the designated number of anchors, the carton is closed by the girl who handles the shear and is placed in a shipping container.

Although lead castings made in gravity molds of this type meet requirements, the casting rate is far below that attained in die casting, hence conversion to die casting is contemplated. The company also produces many other products, most of which are made by methods similar to those described above.

Hydraulic Cylinder, Coil Spring Give Smooth Ride

Cushioning of direct-action hydraulic shock absorber is combined with the resiliency of a variable rate coil spring and the stabilizing effect of torsion steel way bars to give smooth comfortable riding qualities to a recently developed seat for engineers and other members of a locomotive cab crew. Said to provide the occupant with protection against shock, vibration, jar and hard riding, regardless of roadbed, the seat, manufactured by Monroe Auto Equipment Co., Monroe, Mich., is designed for installation to any height in all new and existing locomotives.

We left the toggles out--

and made a better clutch

To simplify means to improve. Again Dodge engineering "know-how" has applied basic principles to make a *great* improvement—the Rolling Grip Clutch. A circle of hardened steel balls, forced into a wedge-shaped groove by a sliding cam, develops the power-transmitting pressure on the friction disc. Cam and groove contours use the principle of the wedge to multiply the force exerted on the shifter collar into a much greater force on the friction disc.

Dodge Rolling Grip Clutches give outstanding flexibility and ease of control without any sacrifice of positive drive. Rugged, compact, easy to adjust and low in cost, this new Clutch is suited to a wide range of applications requiring from 1/2 H. P. to 20 H. P. at 100 R. P. M. Get the details now about this and other new developments by Dodge of Mishawaka to help you cut costs and increase production.

DODGE MANUFACTURING CORPORATION • MISHAWAKA, INDIANA

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of Mishawaka, Ind.

CALL THE TRANSMISSIONEER

He's a factory-trained specialist in the mechanical transmission of power, qualified to analyze your problems and suggest correct equipment. A talk with him will mean savings to you. Look for his name under "Power Transmission Equipment" in your classified telephone directory.

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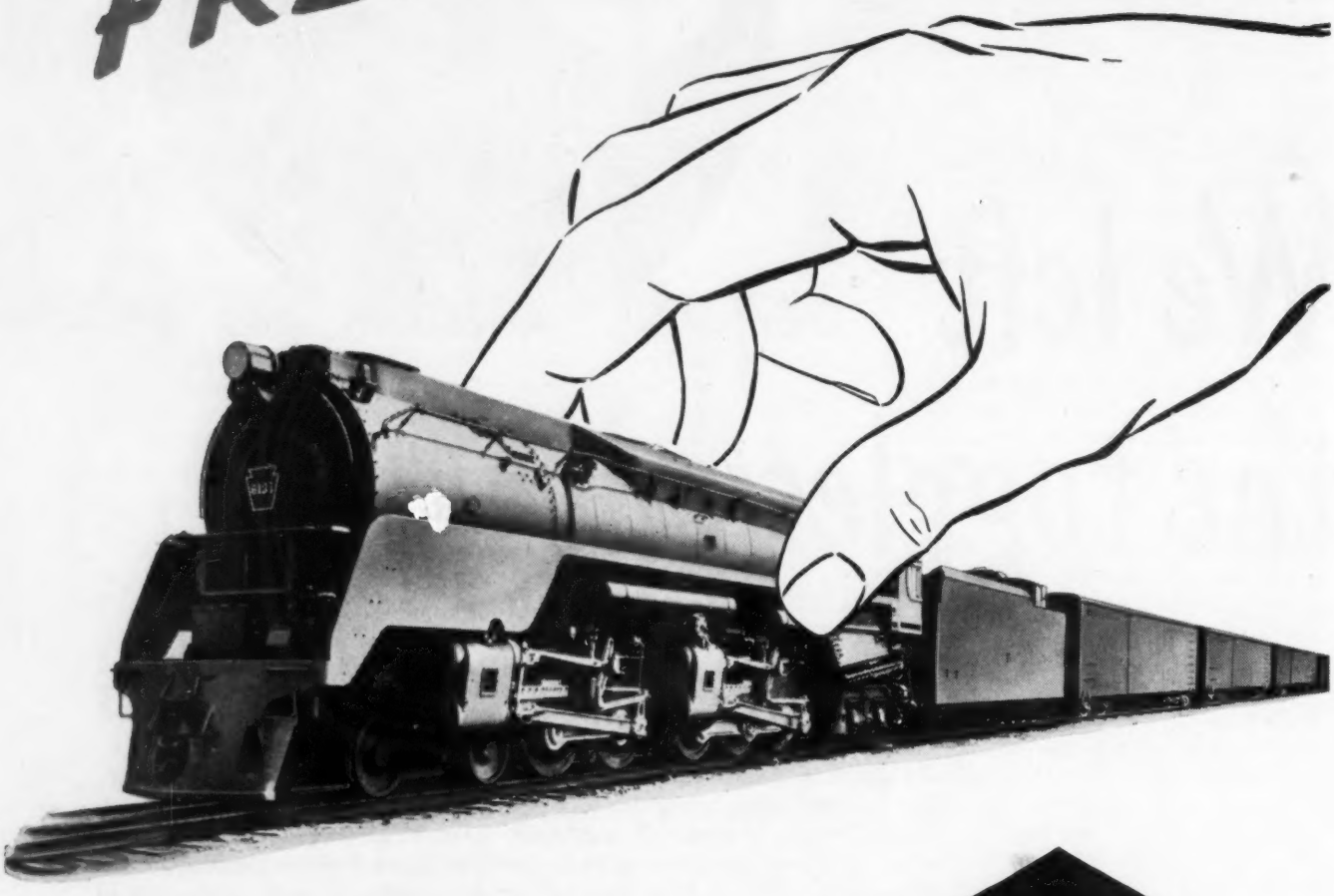
NAME PLATES

FOR YOUR NAME PLATE REQUIREMENTS, WRITE OUR SUBSIDIARY,
ETCHING COMPANY OF AMERICA, 1520 MONTANA STREET, CHICAGO 14, ILLINOIS

LOCOMOTIVES FREIGHT CARS



Pictured above is one of a fleet of 26 powerful locomotives built by the Pennsylvania Railroad Company's Altoona, Pa. Shops. A goodly portion of the steel plate used on these locomotives was furnished by Worth.

Fabricators throughout industry rely upon Worth Plates and Heads for jobs of importance, because they know the quality, uniformity, flawlessness and accuracy of Worth products.

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STEEL PLATES
FLANGED & DISHED HEADS

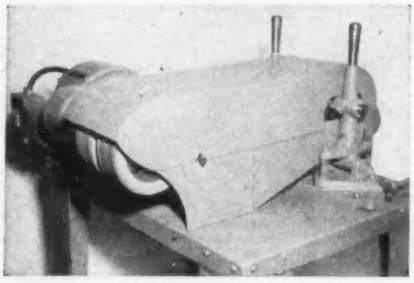
WORTH STEEL COMPANY · Claymont, Delaware

New Products and Equipment

Additional information on the new products and equipment described on this and succeeding pages may be obtained, without obligation, by checking appropriate numbers on the cards following page 140

1. Bench Grinder

Faster, smoother and more economical grinding are advantages of the balanced, accurate abrasive belt used on a resilient contact of the model DBS double abrasive belt grinder manufactured by Porter-Cable Machine Co., Syracuse, N. Y. A heavy duty drive shaft mounts two 7-inch diameter by 2½-inch wide resilient contact rolls located side by side and



inches apart. Each roll is aligned with an idler adjustable for belt tension, tracking and lining up with the contact roll.

Machine is set up to use two endless metal cutting abrasive belts 2½-inches wide and 60 inches circumference. One station may be fitted with a coarse abrasive belt for rough grinding, the other with a fine grit belt for finishing. Grinder is equipped with a ½ hp motor which gives the belt a cutting speed of 5200 surface feet per minute.

2. Tungsten Electrodes

Tungsten electrodes for atomic-hydrogen and inert arc welding are announced by electric welding division of General Electric Co., Schenectady, N. Y. Suitable for manual or automatic welding, they are free from nonmetallic inclusions, segregation, slivers, cracks, seams and pipes. They are available in diameters from 0.040 to ½-in. and in lengths from 3 to 24 in.

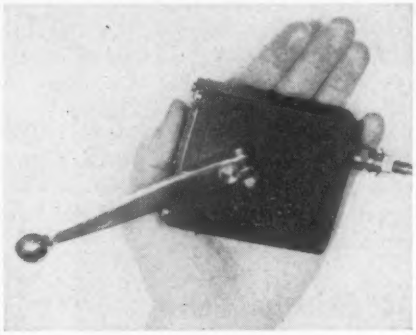
3. Angle Tool

Quick, simple and accurate means of threading any length pipe on the job is provided by hardened, electroplated nipple-guide and pipe-chuck offered by Wing S. Laboratory, 323 Water street, Grass Lake, Mich. Available in sizes from ⅛ to 1 in., they are used with removable or reversible die stocks.

4. Remote Control

Pressure stroke torque capacity of 50-lb-in. is claimed for the new miniature hydraulic remote control developed by Sperry Products Inc., 15th street and Willow avenue, Hoboken, N. J. General uses cover throttle, mixture, governor, valve and position indicator control.

Unit consists of two parts, transmitter and receiver, which form a self-contained, completely enclosed, dust and water proof hydraulic system when joined by a single line of tubing and filled with oil. Copper tubing or flexible hose



make possible installation of units at distances up to 35 ft. Either arm will move through an arc of 60 degrees and receiver arm may be drilled at any location to obtain the desired linear travel of the actuated rod.

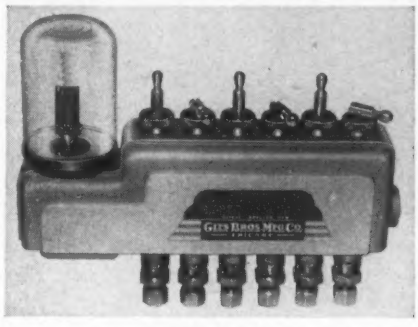
5. Belt Grinders, Polishers

Three general types comprise the line of two-roll vertical abrasive belt grinding and polishing machines introduced by Hill Acme Co., 6442 Breakwater avenue NW, Cleveland 2. Intended for flat polishing of ferrous and nonferrous metals and other materials, three types of machines are: Strip type, for processing strip material in coiled form; plate or bar type, which incorporates use of feed or pinch rolls for conveying material under polishing head; and sheet type with reciprocating hydraulic table drive.

Use of welded steel in all principal parts has made for simplicity of design and construction of machines which are built in a progression of widths up to a maximum of 60 inches. Endless coated abrasive belts 10 feet 6 inches long are used. Vertical polishing head is the same for all three types and covers basically a dynamically balanced upper steel idler roll and a lower rubber covered contact or work roll. Both plate and strip type machines are designed or may be adapted for multistage processing whereby a group of machines may be placed in series for continuous polishing.

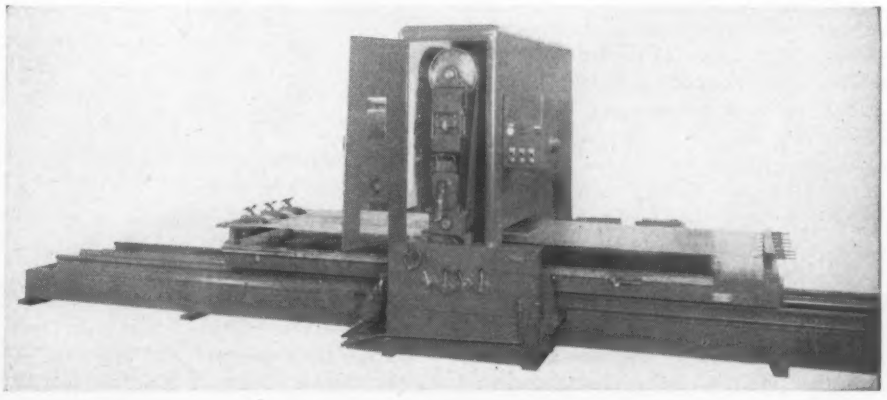
6. Multiple Oiler

Made up of a transparent reservoir of unbreakable plastic with a nonspill valve which simplifies refilling and a main reservoir from which copper tubes lead to various remote oiling points, a new multiple oiler, manufactured by Gits Bros Mfg. Co., 1846 Kilbourn avenue, Chi-



cago, meets the need for a central point of oiling of multiple remote bearings. A feature is a series of valves, one for each lead, which permits the flow to each bearing to be individually adjusted or turned off.

In the main reservoir, fed from the plastic constant level reservoir, the oil is maintained at an even level, insuring



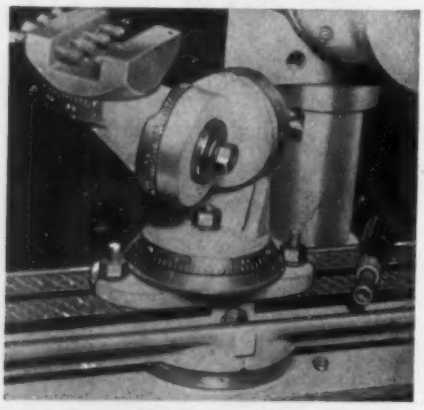
a regulated supply of oil to the individual bearing. The system may be made to serve more than one machine, or it may serve complex units with independently working parts.

7. Brake Drum

A new type of brake drum which has a friction surface of wear resisting alloy steel and an outside layer of copper with specially designed copper fins is announced for heavy buses, trucks, trailers and aircraft by Copperweld Steel Co., Glassport, Pa. Because of high thermal conductivity of the copper, the brake drum dissipates friction-generated heat to the atmosphere at a rapid rate. Virtually no heat checking, no cracking and less wear on blocks and drums are claimed.

8. Tool Grinding Fixture

All types of lathe tools may be ground on the universal work holding fixture made by K. O. Lee Co., Aberdeen, S. Dak., which has four graduated quad-



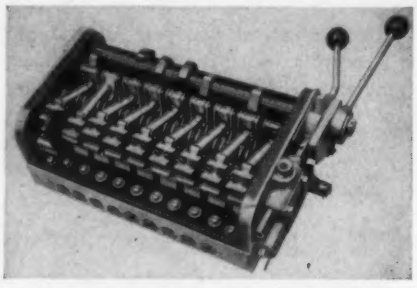
rants permitting fast, accurate setting of any simple or compound angle. Designed primarily for carbide and high speed tool grinding, it may also be used on small grinding operations requiring simple and compound angles. Fixture is equipped with a 1½-in. vise (a 2-in. vise is available) and it may be furnished to fit practically any make of cutter or surface grinder.

9. Truck Controller

Controller of greater current carrying capacity with faster action to conserve power and to safeguard the truck's mechanism when transporting today's heavier unit loads is a development of Elwell-Parker Electric Co., Cleveland. Heart of the unit, called the Rolotac, is a series of nine "trigger fingers" which insure instant response and efficient transfer of current.

Each finger comprises a trunnioned tube which houses a spring enclosing a plunger. A tubular sleeve or piston fits inside the upper end of the tube and outside the plunger spring. Trunnions are supported on arms in the controller frame. Located above and horizontal to the fingers is a ball bearing mounted cam shaft with hard fiber cams. Cam followers which transmit motion to the fingers carry double row ball bearings at their contact with the cam.

In action, the cam follower compresses and then releases the spring which con-



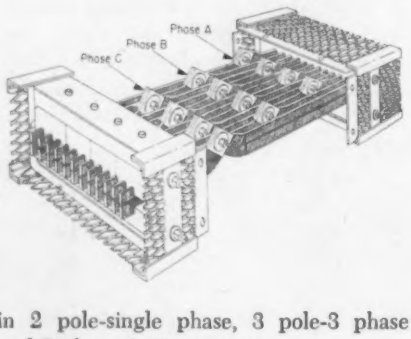
trols pressure of the plunger. The tip of the finger's contact is instantly rocked against the tip of a fixed terminal. Toggle action of the finger then rocks the contact under firm pressure against the fixed terminal.

10. Mending Patch

Torn tracings may be patched without danger of their sticking together or fouling the blueprint machine using the vanishing patch developed by Seal Inc., Shelton, Conn. The patch is a strip of dry film which is welded to the tracing with an electrically heated patch welder. Resulting patch is invisible on the finished prints.

11. Feeder Bus Bars

Designed for conducting long runs of large alternating currents, the new universal feeder bus introduced by National Electric Products Corp., Pittsburgh, is of value where voltage drop must be minimized. It is available in 800, 1000, 1350, 1600 and 2000 amp capacities and



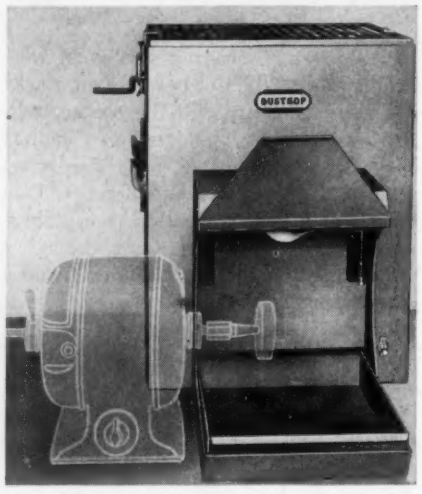
in 2 pole-single phase, 3 pole-3 phase and 3 phase-4 wire types.

Ventilated bus is protected by an expanded steel mesh on all sides, but bus bars are interlaced, wrapped and insulated to assure least possible temperature rise. Silver plated ends of individual bars are bent outward and edgewise at a 45 degree angle to facilitate joining the 10 ft sections. Steel bolts, fitted with flat and lock washers, lock sections together.

12. Dust Collector

Suited for laboratories and other installations where space is limited and where quiet operation and high dust storage capacity is required, the model No. 330 Dustkop dust collector, made by Aget-Detroit Co., Main and Washington streets, Ann Arbor, Mich., is for collecting dust from buffers, polishers, grinders, etc. Self-contained unit needs no installation other than placing in position on the bench and plugging into a 110 v, single phase power outlet.

A ¼ hp, continuous duty 1745 rpm motor drives its paddlewheel fan which is capable of clearing chips and dust from grinding, lint and strings from polishing and buffing as well as sludge



from pumice and other wet finishing operations. Hood has a light fixture for illumination of the work. Removal of collected dust and dirt is by a drawer from left side of the unit. A hand crank above the dust drawer shakes down the spun glass filter material. Unit measures 12 x 18 x 18 in. high.

13. Vacuum Deaerator

Oxygen and other dissolved gases may be removed from cold water in order to prevent corrosion at low temperatures by the Liquon vacuum deaerator built by Liquid Conditioning Corp., Linden, N. J. It consists of a chamber in which water is broken up into thin sprays and films to permit release of the dissolved gases from the exposed water surfaces and a steam ejector or vacuum pump to maintain the necessary vacuum corresponding to the boiling point of water at its comparatively low temperature.

Where steam is available, the vacuum is created by a two-stage ejector with an inter-condenser between, the condenser reducing the amount of gas to be handled

by the second stage of the ejector. Motor driven vacuum pumps are used where steam is not available.

14. Rod Parter

Made in two sizes with capacities of ⅜ and ⅝-in. cold rolled steel bars, the Di-Acro rod parter, introduced by O'Neil-Irwin Mfg. Co., 304 Eighth avenue, Lake City, Minn., accurately cuts or parts off to very close tolerances as to length,

squareness and concentricity. Incorporating a powerful multiple leverage arrangement, the device may be easily operated by either men or women. Rods as small as 1/32-in. diameter may be handled.

Cutting heads are of heavy alloy tool steel, hardened and ground. Two operating handles cover the complete material range. A three-way adjustable material length gage allows rods to be positioned and parted quickly. Numerous holes in the cutting head make possible choice of a cutting hole of exact material size, allowing rod to be parted without loss of concentricity.

15. Wire Rope Lubricant

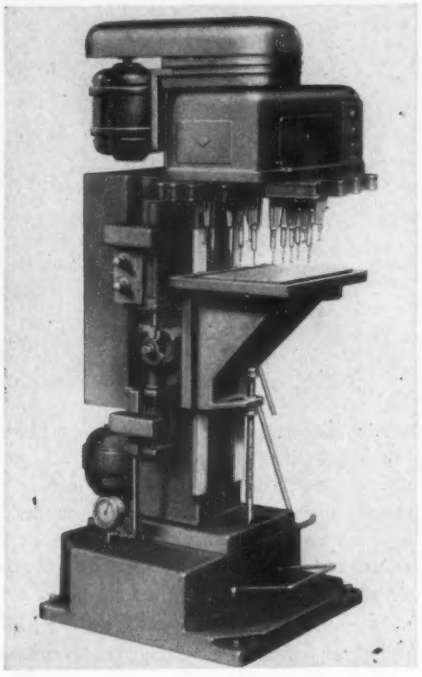
Klingfast wire rope lubricant, available in colors to identify as well as protect, is offered by Brooks Oil Co., Pittsburgh. Its properties are resistant to abrasion and corrosion, high affinity for steel and other metals, high resistance to water and resistance to deterioration caused by temperature extremes.

16. Drilling, Tapping Units

National Automatic Tool Co. Inc., Richmond, Ind., announces a line of small drilling and tapping machines which are designed to speed production of small holes on light work. Model A-33A (illustrated) provides hand and foot feed or combination hand and foot and air oil feed. It is equipped for both drilling and tapping and its head is bored for 10 spindles with speeds available from 650 to 3550 rpm and sheave arrangements providing 10 speed variations. Motors of 1 hp are available for 110, 200 and 440 v, 60 cycles, 3-phase ac.

FOR MORE INFORMATION
on products and equipment described in this section, fill in a card following page 140.

As on the other machine, all electrical equipment on the A-33B machine is pro-



tected against dirt and dust. It is equipped for air feed and has the same head, spindle speeds and sheave arrangements. Table feed is 2½-in. maximum as compared with 4 in. in the A-33A machine. The air fed machine is available with coolant system, cluster plate, slip spindle plate and other equipment.

17. Oxyacetylene Regulator

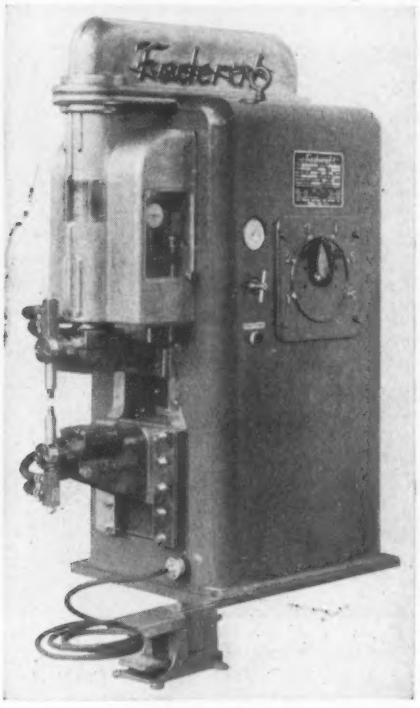
All machined parts, including bodies and caps, are turned from solid bar stock in the oxy-acetylene two-stage regulators developed in various styles for light and heavy welding, cutting and heating, by National Welding Equipment Co., 218 Fremont street, San Francisco 5. They are of large capacity and provide for the reduction of compressed air gases by two separate valve seat and diaphragm assemblies.

Two-stage reduction method offers constant, nonfluctuating gas delivery, regardless of decrease in contents of gas cylinder. Design enables them to control and soften the sudden compression of full cylinder pressures, avoiding danger of damage to operating parts.

18. Spot, Projection Welder

Air operated, a general purpose bench type combination spot and projection welder manufactured by Federal Machine & Welder Co., 17 Dana street, Warren, O., may be used in welding mild steel, stainless steel, aluminum, etc. It is equipped with a low inertia rubber head with microswitch firing. The vertically adjustable lower knee, horns and water cooled point holders are standard.

The 30 kilovolt-ampere transformer, contained within the frame, has six steps of heat regulation which are controlled by the tap switch arrangement on the side of the machine. A plug-in type op-



erating switch leaves the operator's hands free to handle the material being welded.

Welder has a 2¼-inch stroke, actuated by an air-operated double acting cylinder. Throat depth from machine face to electrode center line is 6 inches; from machine face to platen center, 4½-inches.

19. Level Control

Contact with the liquid is made by stainless steel probe rods in the type 10CB1X level control made by Photoswitch Inc., 77 Broadway, Cambridge 42, Mass. Accuracy is independent of temperature and pressure.

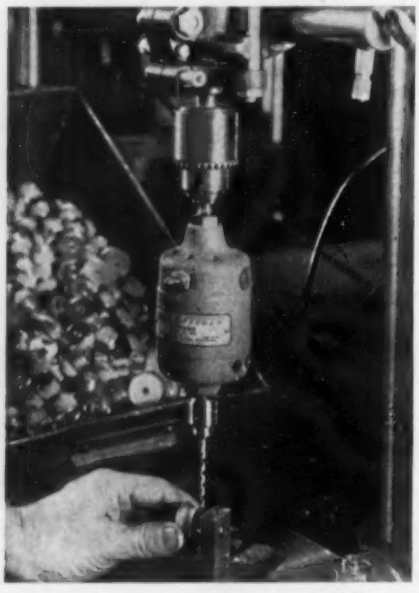
An alternating current control combines a probe circuit and transformer in a unique manner to operate a direct current relay, insuring heavy contact pressures and long relay life. Probe rods

project into the tank to levels corresponding to the low point where pumping starts and high point where pumping stops.

Control is supplied in an explosion-proof housing or in a pressed steel, dust tight enclosure. Operation is on 115 or 230 v, 25/60 cycles ac. Output is 2 amp at 115 v, 1 amp at 220 v. Probe circuit is matched to the electrical conductivity of the liquid to be controlled.

20. High Speed Drill

Manufactured by Dumore Co., Racine, Wis., a new Drillspeeder is a sturdy self contained high speed electric drill which fits into the chuck of any standard drill press, lathe, milling machine or specially designed machine or fixture. Equipped with a ⅜-in. straight shank of No. 2 Morse taper shank, the



drill supplies its own power—1/16 hp—at speed of 17,000 rpm for drills from No. 80 up to ⅛-in. diameter.

Its Jacobs chuck and motor parts are accurately balanced so that small hole drilling may be performed at high speed with minimized drill breakage. It may be used to advantage by the tool designer and production man when setting up for short runs.

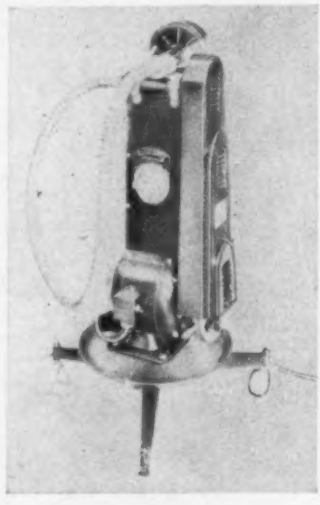
21. Square Gage Blocks

Fonda Gage Co., Stamford, Conn., is announcing a full range of sizes in its Lifetime-Carbide square gage blocks which are guaranteed not to grow or shrink over any period of time. New style blocks are manufactured in both grade A (plus or minus 0.000004-in.) and grade B (plus or minus 0.000008-in.).

Individual blocks range in size from 0.050-in. to 4.000-in. and complete sets are made up of 35 and 82 pieces. Blocks are resistant to corrosion and are extremely wear resistant. Flatness and parallelism remain constant under all working temperatures.

22. Flexible Shaft Machine

Featuring variable speed, a flexible shaft machine manufactured by Wyzenbeek & Staff Inc., 838 West Hubbard street, Chicago 22, gives the operator complete speed control of a precision shaft which may be instantly adjusted to any desired speed for different sizes of grinding wheels. Other features are a



safety cabinet which swivels on ball bearing motor base and which fully encloses speed change mechanism and belt guard, low center of gravity, eccentric lock which holds handpiece for use as a stationary grinder and an eccentric adjustment for belt tightening.

Machine is equipped with shaft, handpiece, wheel arbor, 6-in. grinding wheel and wheel guard with outboard handle. Four models are offered: ½ hp, 1800-4000 rpm; ¾ hp, 1800-4000 rpm; ¾ hp, 3000-5800 rpm; and 1 hp, 2200-4200 rpm. All are equipped with 50 or 60 cycle, single or 3-phase motors.

23. Stand-Off Terminals

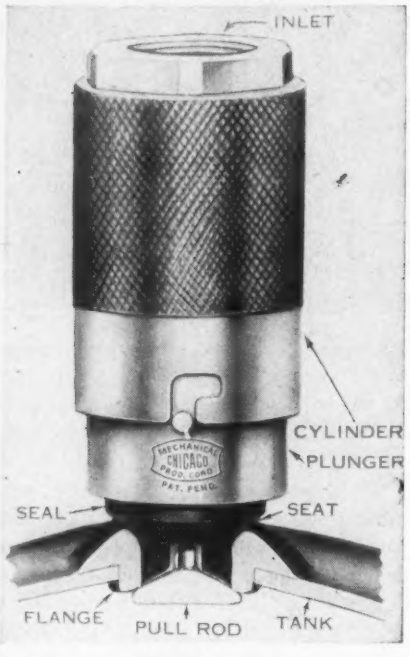
Line of small stand-off terminals which provide a rugged, well insulated tie point or mounting block in a minimum of space is manufactured by Winchester Co., 6 East 46th street, New York 17. The molded melamine body of each unit gives good mechanical and dielectric strength and molded-in terminals, machined of brass, are silver plated for easy soldering.

High voltage control stand-off No. 401 is offered for the mounting of controls in high voltage circuits. It is easily mounted, fits all variable resistors, and affords ample insulation to prevent voltage breakdown. Spacing between high voltage and grounded metal parts is 1 3/16-in.

Four-contact miniature connectors made by the company are designed for limited space installations. The one-piece inserts are molded of melamine. Silver plated phosphor bronze sockets insure good contact action. Machined contacts take maximum wire size of No. 20 AWG. A lug grounds any one of the four contacts.

24. Filling Connector

Self-sealing Hydro-Matic filling conectors for instantly adapting air or liquid pressure lines to their products for making hydrostatic or pneumatic internal pressure tests are manufactured by Mechanical Products Corp., 168 North Ogden avenue, Chicago 7. Connectors are time saving in that they may be attached



to plain or threaded pressure line openings in a matter of seconds.

Greater pressure area being provided against the plunger and seal, than the back pressure area through the tank opening accomplishes the sealing, thus forcing and holding the seal firmly against its seat until pressure within the tank or vessel under test is released.

Rustproof connectors, suitable for testing pressures up to 500 psi made with ½, ¾ and 1 in. pipe inlets, are adaptable to ¾, 1 and 1¼-in. pipe openings.

FOR MORE INFORMATION
on the new products and equipment in this section, fill in a card. It will receive prompt attention.

Sharp Break in Scrap Puts Halter on Runaway Market

Prices marked down $2 to $3.50 per ton on steelmaking grades at most consuming points. Material reported flowing in better volume. Large producer ties pig iron price to scrap. Steel market not likely to be immediately affected

SCRAP took a nosedive last week, prices declining $2 to $3.50 per ton at virtually all important consuming points, but whether this show of weakness was the beginning of the long hoped for correction in this market remains to be definitely confirmed.

Unquestionably the zing has gone out of the current market, but it still is in a basically bullish position with supplies none too plentiful and consumption at an unprecedented rate for peacetime.

The sharp break in scrap, which followed a period of restricted buying by the steel mills, is reflected in a drop of more than three points in STEEL's scrap composite to $38.50. With the market on heavy melting steel at Pittsburgh definitely quoted under $40 for the first time in several weeks the upward trend, under way the past three months or so, appears at least temporarily halted.

Easier flow of material is accompanying the price decline with some large buyers who had been out of the market placing substantial orders. Most consumers have only modest stocks, however, and hence, with steel production being maintained at a high rate, it is uncertain whether further weakness will develop. Scrap stocks have not materially increased over the summer months.

Pig iron is in a very tight market with the merchant trade virtually gasping for tonnage as a result of the increased diversion of hot metal to steelmaking furnaces in lieu of scrap.

Last week Republic Steel Corp. inaugurated a new pig iron pricing policy at Buffalo and Cleveland furnaces aimed at bringing pig iron in line with scrap. Effective Aug. 13 it began quoting pig iron at Cleveland and Buffalo on the basis of published heavy melting scrap quotation, when the latter exceeds the pig iron price. Usual differentials apply on foundry, bessemer, and malleable grades. Adjustments will be made upward as the scrap price rises, but on a downturn in scrap the pig iron prices will be revised downward only to the level of currently published prices on pig iron.

Even though scrap should drop still further, there is little likelihood steel product prices will be materially affected. Scrap has been far out of line from normal in relation to steel as well as pig iron. Actually, steelmakers claim they have been absorbing part of the higher production costs resulting from the fantastic prices they have had to pay for scrap, such cost not being wholly covered by the recent general advance in steel product quotations of $5 to $10 per ton.

The new price schedules on steel products are taking hold, being accepted without too much grumbling on the part of consumers. Some further adjustments are likely, however, especially in extra cards. Recently some extra card revisions on the flat-rolled steel items were effected. These latter incorporated changes which in some cases raise delivered prices on certain specifications $2 to $3 per ton. Meanwhile, demand for steel continues as pressing as ever with little sign of early relief in tight items.

The national steel ingot rate declined 1 point last week to 94 per cent of capacity. The Cleveland district schedule was unique in that it was the only one showing an increase, rising 5½ points to 96.5 per cent. The rate dropped 12 points to 81.5 per cent at Wheeling, 4 points to 88 per cent at Detroit, 1 point to 93 per cent in eastern Pennsylvania, and ½ point to 100 per cent and 93.5 per cent at Pittsburgh and Chicago, respectively.

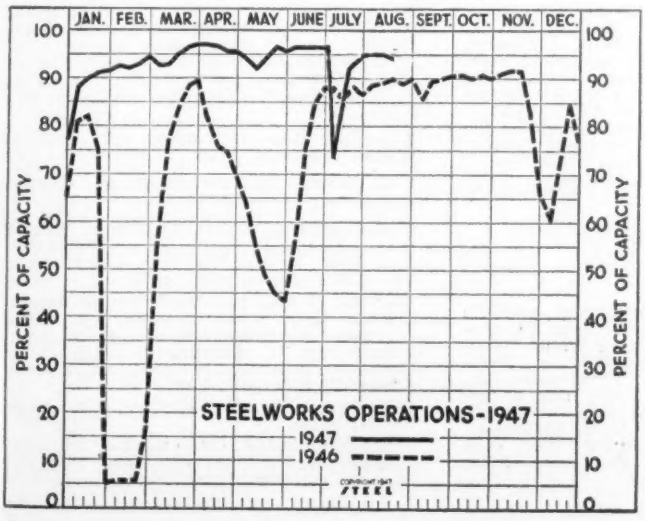
STEEL's composite market price average on steelmaking scrap dropped to $38.50 from $41.75, reflecting price weakness at all major consuming points. Price average for steelmaking pig iron held unchanged at $35.61, although undertone was stronger as one leading producer raised prices at Cleveland and Buffalo to the level of heavy melting scrap. Finished and semifinished steel price averages held unchanged at $75.41 and $56.80, respectively.

DISTRICT STEEL RATES

Percentage of Ingot Capacity Engaged in Leading Districts

	Week Ended Aug. 16	Change	Same Week 1946	Same Week 1945
Pittsburgh	100	— 0.5	98.5	45
Chicago	93.5	— 0.5	92.5	40
Eastern Pa.	93	— 1	81	77
Youngstown	92	None	88	53
Wheeling	81.5	—12	93.5	64.5
Cleveland	96.5	+ 5.5	91.5	50
Buffalo	88.5	None	88.5	62.5
Birmingham	99	None	99	95
New England	90	None	90	84
Cincinnati	87	None	89	58
St. Louis	84.5	None	54.5	50
Detroit	88	— 4	90	62
Estimated national rate	94	— 1	90	60

Based on weekly steelmaking capacity of 1,749,928 net tons for 1947; 1,762,381 net tons for 1946; 1,831,636 tons for 1945.



COMPOSITE MARKET AVERAGES

	Aug. 16	Aug. 9	Aug. 2	One Month Ago July, 1947	Three Months Ago May, 1947	One Year Ago Aug., 1946	Five Years Ago Aug., 1942
Finished Steel	$75.41	$75.41	$69.14	$70.80	$69.82	$64.45	$56.73
Semifinished Steel	56.80	56.80	52.10	53.04	52.10	40.60	36.00
Steelmaking Pig Iron	35.61	35.61	35.61	33.82	32.49	27.50	23.00
Steelmaking Scrap	38.50	40.42	39.08	37.23	29.75	19.17	19.17

Finished Steel Composite:—Average of industry-wide prices on sheets, strips, bars, plates, shapes, wire, nails, tin plate, standard and line pipe. **Semifinished Steel Composite:**—Average of industry-wide prices on billets, slabs, sheet bars, skelp and wire rods. **Steelmaking Pig Iron Composite:**—Average of basic pig iron prices at Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Neville Island, Granite City and Youngstown. **Steelworks Scrap Composite:**—Average of No. 1 heavy melting steel prices at Pittsburgh, Chicago and eastern Pennsylvania. Finished steel, net tons; others, gross tons.

COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished material (except tin plate) and wire rods, cents per lb; coke, dollars per net ton; others, dollars per gross ton.

Finished Material

	Aug. 16, 1947	July, 1947	May, 1947	Aug., 1946
Steel bars, Pittsburgh	2.90c	2.66c	2.60c	2.50c
Steel bars, Philadelphia	3.28	3.06	2.98	2.86
Steel bars, Chicago	2.90	2.66	2.60	2.50
Shapes, Pittsburgh	2.80	2.56	2.50	2.35
Shapes, Philadelphia	2.94	2.70	2.64	2.48
Shapes, Chicago	2.80	2.56	2.50	2.35
Plates, Pittsburgh	2.95	2.71	2.65	2.50
Plates, Philadelphia	3.15	2.91	2.85	2.558
Plates, Chicago	2.95	2.71	2.65	2.50
Sheets, hot-rolled, Pittsburgh	2.80	2.56	2.50	2.425
Sheets, cold-rolled, Pittsburgh	3.55	3.27	3.20	3.275
Sheets, No. 10 galv., Pittsburgh	3.90	3.63	3.55	†4.05
Sheets, hot-rolled, Gary	2.80	2.56	2.50	2.425
Sheets, cold-rolled, Gary	3.55	3.27	3.20	3.275
Sheets, No. 10 galv., Gary	3.90	3.63	3.55	†4.05
Strip, hot-rolled, Pittsburgh	2.80	2.56	2.50	2.45
Strip, cold-rolled, Pittsburgh	3.55	3.27	3.20	3.05
Bright basic, bess. wire, Pittsburgh	3.675	3.475	3.425	3.05
Wire nails, Pittsburgh	4.25	3.975	4.125	3.75
Tin plate, per base box, Pittsburgh	$5.75	$5.75	$5.75	*$5.25

* Nominal. † Base, No. 24 gage.

Semifinished Material

Sheet bars, Pittsburgh, Chicago	$60.00	$52.00	$50.00	$38.00
Slabs, Pittsburgh, Chicago	47.50	43.60	42.00	39.00
Rerolling billets, Pittsburgh	47.50	43.60	42.00	39.00
Wire rods $\frac{7}{32}$ to $\frac{1}{4}$-inch, Pitts.	2.825c	2.60c	2.55c	‡2.30c

‡ Base, No. 5 to $\frac{9}{32}$-in.

Pig Iron

	Aug. 16, 1947	July, 1947	May, 1947	Aug., 1946
Bessemer, del. Pittsburgh	$37.83	$36.03	$34.83	$29.77
Basic, Valley	36.00	34.20	33.00	28.00
Basic, eastern del. Philadelphia	38.72	36.92	35.52	29.93
No. 2 fdry., del. Pgh. N. & S. sides	37.33	35.53	34.33	29.27
No. 2 fdry., del. Philadelphia	39.22	37.61	36.02	30.43
No. 2 foundry, Chicago	36.00	34.20	33.00	28.50
Southern No. 2 Birmingham	33.38	31.98	29.88	24.88
Southern No. 2, del. Cincinnati	38.25	36.85	34.75	28.94
Malleable, Valley	36.50	34.70	33.50	28.50
Malleable, Chicago	36.50	34.70	33.50	28.50
Charcoal, low phos., fob Lyles, Tenn.	44.00	43.00	40.50	33.00
Gray forge, del. McKees Rocks, Pa.	36.66	34.86	33.66	28.61
Ferromanganese, fob cars, Pittsburgh	140.25	140.25	140.25	140.00

Scrap

Heavy melt. steel, No. 1, Pittsburgh	$39.50	$37.20	$30.00	$20.00
Heavy melt. steel, No. 2, E. Pa.	37.25	38.55	28.35	18.75
Heavy melt. steel, Chicago	38.75	35.95	29.25	18.75
Rails for rerolling, Chicago	46.25	43.20	34.50	22.25
No. 1 cast, Chicago	43.50	41.10	38.50	20.00

Coke

Connellsville, beehive furnace	$12.00	11.20	9.125	8.75
Connellsville, beehive foundry	14.50	13.05	10.375	9.50
Chicago, oven foundry, del.	18.50	17.46	16.10	15.10

FINISHED AND SEMIFINISHED IRON, STEEL PRODUCTS

Finished steel quoted in cents per pound and semifinished in dollars per gross ton, except as otherwise noted. Prices apply on an individual producer basis to products within the range of sizes, grades, finishes and specifications produced at its plants. Delivered prices do not include the 3 per cent federal tax on freight.

Semifinished Steel

Carbon Steel Ingots: Rerolling quality, standard analysis, price negotiated, fob mill. Forging quality $46, Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown.

Alloy Steel Ingots: Pittsburgh, $56.

Rerolling Billets, Blooms, Slabs: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, Youngstown, $45-$50, sales by smaller interests on negotiated basis at $65 or higher. Detroit, del., $53; eastern Mich., $54.

Forging Quality, Billets, Blooms, Slabs: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, Youngstown, $55-$58; Detroit, del., $61; eastern Mich., $62.

Alloy Billets, Slabs, Blooms: Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon, $66, del. Detroit $69, eastern Mich., $70.

Sheet Bars: Pittsburgh, Chicago, Cleveland, Buffalo, Canton, Sparrows Point, Youngstown, $60; sales by smaller interests on negotiated basis at $66 or higher.

Skelp: Pittsburgh, Sparrows Point, Youngstown, Coatesville, 2.60c-2.65c per lb.

Tube Rounds: Pittsburgh, Chicago, Gary, Cleveland, $69.

Wire Rods: Pittsburgh, Chicago, Birmingham, $\frac{7}{32}$ to $\frac{1}{4}$-in., inclusive $2.80-3.05 per 100 lb. Galveston base, $2.95. Worcester, 2.90c. San Francisco (base del.), $3.22.

Bars

Hot-Rolled Carbon Bars and Bar-Size Shapes under 3-in.: Pittsburgh, Youngstown Chicago, Gary, Cleveland, Buffalo, Birmingham, Duluth, base, 20 tons one size, 2.90c; Detroit, del., 3.05c; eastern Mich., 3.10c; New York, del., 3.31c; Phila., del., 3.28c; San Francisco (base, del.), 3.63-3.95c; Los Angeles (base, del.), 3.625-3.86c; Seattle, 3.58c, base.

Rail Steel Bars: Same basing points as merchant carbon bars, except base is 10 tons. Prices upon application.

Hot-Rolled Alloy Bars: Pittsburgh, Youngstown, Chicago, Canton, Massillon, Buffalo, Bethlehem, base 20 tons one size, 3.30c; Detroit, del., 3.45c; eastern Mich., 3.50c. (Texas Steel Co. uses Chicago base price as maximum fob Fort Worth, Tex., price on sales outside Texas, Oklahoma.)

Cold-Finished Carbon Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base 20,000-39,999 lb., 3.55c; Detroit, del., 3.70c; Toledo, 3.75c.

Cold-Finished Alloy Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Canton, base, 4.10c; Detroit, del., 4.25c; eastern Mich., 4.30c.

Reinforcing Bars (New Billet): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Sparrows Point, Buffalo, Youngstown, base, 2.75c; San Francisco (base, del.), 3.33c; Los Angeles (base, del.), 3.325c; Seattle, 3.88c, base.

Reinforcing Bars (Rail Steel): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Buffalo, base price upon application.

Iron Bars: Single refined, Pittsburgh 7.15c-†7.70c; double refined, 8.00-†9.75c; Pittsburgh, staybolt, 8.85c-†11.25c.

† Hand puddled.

Sheets

Hot-Rolled Sheets (18 gage and heavier): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown, Sparrows Point, Ashland, Ky., base, 2.80c; Detroit, del., 2.95c; eastern Mich., del., 3.00c; Philadelphia, del., 3.00c; New York, del., 3.09c; Los Angeles (base, del.), 3.54c; San Francisco, (base, del.), 3.545c. (Andrews Steel Co. quotes Middletown, O., base for shipment to Detroit. Alan Wood Steel Co., Conshohocken, Pa., quotes 3.40c, Sparrows Point equivalent.)

Cold-Rolled Sheets: Pittsburgh, Chicago, Cleveland, Gary, Buffalo, Youngstown, Middletown, base, 3.55c; Detroit, del., 3.70c; eastern Mich., del., 3.75c; New York, del., 3.96c; Philadelphia, del., 3.93c.

Galvanized Sheets, No. 10: (Based on 5 cent zinc) Pittsburgh, Chicago, Gary, Birmingham, Youngstown, Sparrows Point, Canton, Middletown, base 3.85c-3.95c; New York, del., 4.24c; Philadelphia, del., 4.15c; Los Angeles (base, del.), 4.62c; San Francisco (base, del.), 4.625c.

Corrugated Galvanized Sheets, No. 10: (Based on 5 cent zinc) Pittsburgh, Chicago, Gary, Birmingham base, 4.05c.

Culvert Sheets, No. 16 flat: (Based on 5 cent zinc), corrugated 10 cents extra; Pittsburgh, Chicago, Gary, Birmingham: Copper alloy, 4.55c; copper-iron or pure iron, 4.90c. Granite City base prices 10 points higher. Los Angeles (base, del.), 5.24c; San Francisco (base, del.) 5.245c.

Aluminized Sheets: Hot-dipped, coils or cut to lengths: Pittsburgh, 7.50c.

Long Ternes, No. 10: Pittsburgh, Chicago, Gary, base, 3.85c-4.05c.

Enameling Sheets, No. 12: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, base, 3.95c; Granite City, base, 4.05c; Detroit, del., 4.10c; eastern Mich., 4.15c.

Electrical Sheets, No. 24: Field: Pittsburgh, Chicago, Gary, 4.50c; Kokomo, Ind., 4.60c. Armature: Pittsburgh, Chicago, Gary, 4.80c; Granite City, Ill., Kokomo, Ind., 4.90c. Electrical: Pittsburgh, Chicago, Gary, 5.30c; Granite City, Kokomo, 5.40c.

Motor: Pittsburgh, Chicago, Gary, 6.05c; Granite City, 6.15c.

Dynamo: Pittsburgh, 6.75c; Granite City, 6.85c. Transformer 72, 7.25c; 65, 7.95c; 58, 8.65c; 52, 9.45c, Pittsburgh.

Strip

Hot-Rolled Strip: Pittsburgh, Chicago, Gary, Birmingham, Youngstown, base, 2.80c; Detroit, del., 2.95c; eastern Mich., del., 3.00c; San Francisco (base del.), 3.605c; Los Angeles (base del.), 3.60c.

Cold-Rolled Strip, 0.25 carbon and less: Pittsburgh, Cleveland, Youngstown, 3.55c; Chicago, base, 3.65c; Detroit, del. 3.70c; eastern Mich., 3.75c; Worcester, base, 3.75c-4.10c.

Cold-Finished Spring Steel: Pittsburgh, Cleveland base: 0.26-0.40 carbon, 3.55c; over 0.40 to 0.60 carbon, 5.05c; over 0.60 to 0.80, 5.65c; over 0.80 to 1.00, 7.15c; over 1.00, 9.45c; add 0.20c for Worcester.

Tin, Terne, Plate

Tin Plate: Pittsburgh, Chicago, Gary, Warren, O., 100-lb base box, $5.75; Granite City, Birmingham, Sparrows Point, $5.85.

Electrolytic Tin Plate: Pittsburgh, Gary, Warren, O., 100-lb base box 0.25 lb tin, $4.85; 0.50 lb tin, $5.05; 0.75 lb tin, $5.25; Granite City, Birmingham, Sparrows Point, $4.95 $5.15, $5.35, respectively.

Tin Mill Black Plate: Pittsburgh, Chicago, Gary, Warren, O., base 29-gage and lighter, 3.60c; Granite City, Birmingham, Sparrows Point, 3.70c.

Manufacturing Ternes (Special Coated): Pittsburgh, Chicago, Gary, 100-lb base box $4.90; Granite City, Birmingham, Sparrows Point, $5.00.

Roofing Ternes: Pittsburgh base per package 112 sheets; 20 x 28 in., coating I.C. 8-lb $13.50; 15-16 $15.50.

Plates

Carbon Steel Plates: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Sparrows Point, 2.95c; Coatesville, Claymont, 3.15c; Geneva, Utah, 3.10c; New York, del. 3.24c; Phila., del., 3.15c; St. Louis, del., 2.77c; Boston, del., 3.16c; San Francisco and Los Angeles, del., 3.29c-3.46c.
(Central Iron & Steel Co., Harrisburg, Pa., 4.15c, basing points.)

Floor Plates: Pittsburgh, Chicago, 4.20c.

Open-Hearth Alloy Plates: Pittsburgh, Chicago, 3.80c-4.137c; Coatesville, 4.50c.

Clad Steel Plates: Coatesville, 10% cladding: Nickel clad, 21.50c; inconel-clad, 30.00c; monel-clad, 29.00c.

Shapes

Structural Shapes: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Bethlehem, 2.80c; New York, del., 3.00c; Phila., del., 2.94c; Geneva, Utah (base, del.), 2.975c; Los Angeles (base, del.), 3.17c-3.41c; Los Angeles and San Francisco (sizes produced at Geneva only), del., 3.14c; Kaiser, del., San Francisco, 3.41c.
(Phoenix Iron Co., Phoenixville, Pa., nominally, 4.00c, fob Phoenixville.)

Alloy Structural Shapes: Pittsburgh, Chicago, 3.55c.

Steel Piling: Pittsburgh, Chicago, Buffalo, $3.30 per 100 lb.

Wire and Wire Products

(Fob Pittsburgh, Chicago, Cleveland and Birmingham per 100 pounds).

Wire to Manufacturers in carloads

Bright, basic or bessemer *$3.55–3.80
Spring (except Birmingham)....**$4.25–**4.50

Wire Products to Trade

Nails

Standard and cement-coated..... †$4.25
Galvanized ..... ‡$4.00
Staples, polished and galvanized..... $4.25

Wire, Merchant Quality

Annealed (6 to 8 base) ..... §$4.20
Galvanized (6 to 8 base)..... §$4.65
(Fob Pittsburgh, Chicago, Birmingham, per base column)
Woven fence, 15 gage and heavier... ††91
Barbed wire, 80-rod spool..... ††101
Barbless wire, twisted 94
Fence posts (no clamps) ..... ††90
Bale ties, single loop ..... ††91

* Worcester, $3.65, Duluth, $3.60, base. San Francisco (base, del) $4.56 for bright basic only.

** Worcester $4.60, Duluth and Trenton, N. J., $4.75, base. San Francisco (base, del.) $5.63 for MB spring wire; $5.28 black premier.

† Worcester $4.55, Cleveland $4.35, base. San Francisco (base, del.) $5.33.

‡ Duluth $4.00, Cleveland $4.10, base. San Francisco (base, del.) $5.08.

§ Worcester $4.30, annealed; $4.75, galvanized. Duluth $4.20, annealed; $4.65, galvanized. San Francisco (base, del.) $5.21, annealed; $5.66, galvanized.

†† San Francisco (base, del.): Woven fence, 114; barbed wire, 121; bale ties, 115. Duluth (base): Woven fence, 91; barbed wire, 101; fence posts 90.

Rails, Supplies

Rails: Standard, over 60-lb fob mill, $2.75 per 100 lb. Light rails (billet), Pittsburgh, Birmingham, $3.10 per 100 lb; light rails (rail steel), Williamsport, Pa., Pittsburgh prices upon application.

Relaying, 60 lb and over fob warehouse $55-$56 per net ton.

Supplies: Track bolts, 7.00c; heat treated, 7.25c. Tie plates, $3.05 per 100 lb, fob mill; $3.40 base, Seattle; $3.20, base, Pittsburg, Calif. Splice bars, $3.25 per 100 lb, fob mill. Standard spikes, 4.00c-4.50c; screw spikes, 5.80c-6.40c. Axles, 4.10c.

Tubular Goods

Standard Steel Pipe: Base price in carlots, threaded and coupled, to consumers about $200 a net ton. Base discounts Pittsburgh on all types; Lorain on steel butt weld, and seamless; Gary, Ind., 2 points less on steel lap weld and 1 point less on steel butt weld on sizes produced in that district.

	Butt Weld				
In.	Blk.	Gal.	In.	Blk.	Gal.
⅛	46	19½	1	56	41½
¼	47	25	1¼	56½	42
⅜	44	22	1½	57	42½
½	50½	34½	2	57½	43
¾	53½	38½	2½ & 3	58	43½

	Lap Weld		Elec. Weld		Seamless	
In.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
2	49	34	48½	33½	48	33
2½-3	52	37	51½	36½	51	36
3½-6	54	39	53½	38½	53	38

Line Steel Pipe: Base price in carlots to consumers about $200 a net ton. Base discounts Pittsburgh and Lorain, O.

In.	Butt Weld	In.	Butt Weld
⅛	45	1	55
¼	46	1¼	55½
⅜	43	1½	56
½	49½	2	56½
¾	52½	2½ & 3	57

In.	Lap Weld	Elec. Weld	Seamless
2	48	47½	47
2½ & 3	51	50½	50
3½-6	53	52½	52
8	53½	53	52½
10	53	52½	52
12	52	51½	51

(Following prices and discounts nominal pending issuance of new schedules by producers.)

Boiler Tubes: Net base prices per 100 feet fob Pittsburgh, in carload lots, minimum wall, cut lengths 4 to 24 feet, inclusive.

		——Seamless——		—Elec. Weld—	
O.D.		Hot	Cold	Hot	Cold
Sizes	B.W.G.	Rolled	Drawn	Rolled	Drawn
1"	13	....	$10.89	$10.62	$10.62
1¼"	13	....	12.90	10.59	12.58
1½"	13	$12.00	14.26	11.70	13.90
1¾"	13	13.65	16.23	13.31	15.82
2"	13	15.29	18.17	15.00	17.95
2¼"	13	17.05	20.26	16.71	20.00
2¼"	12	18.78	22.31	18.38	22.00
2½"	12	20.57	24.43	20.11	24.07
2¾"	12	21.80	25.89	21.27	25.46
3"	12	22.87	27.18	22.26	26.68
3¼"	11	26.88	31.94	26.15	31.33
3½"	11	28.86	34.30	28.06	33.64
4"	10	35.82	42.55	34.78	41.6[illegible]
4½"	9	47.48	56.42	....	..
5"	9	54.96	65.30	....	..
6"	7	84.38	100.2[illegible]	....	....

Pipe, Cast Iron: Class B, 6-in. and over $65 per net ton, Birmingham; $70, Burlington, N. J.; $75.56, del., Chicago; 4-in. pipe, $5 higher, Class A pipe, $3 a ton over class B.

Bolts, Nuts

Fob Pittsburgh, Cleveland, Birmingham, Chicago; add 15c per cwt, Lebanon, Pa. Additional discounts: 5 for carloads; 15 for full containers, except tire, step and plow bolts.

Carriage and Machine Bolts

½-in. and smaller; up to 6 in. in length	48 off
⅝ and ¾ x 6-in. and shorter.....	50 off
Larger diameter; longer than 6 in.....	47 off
Tire bolts	38 off
Step bolts	46 off
Plow bolts	57 off
Lag bolts	
¼ in. up to 1 in., 6 in. and shorter..	50 off
¼ in. up to 1 in., longer than 6 in...	48 off

Stove Bolts

In packages, nuts separate, 65-10 off; bulk 75 off on 15,000 of 3-in. and shorter, or 5000 over 3-in., nuts separate.

Nuts

Semifinished hexagon	A.S. Light	A.S. Reg. and Heavy
⅞-in. and smaller	51 off	.....
½-in. and smaller	.....	50 off
½-in.-1-in.	48 off	.....
⅞-in.-1-in.	.....	49 off
1⅛-in.-1½-in.	46 off	47 off
1⅝-in. and larger	.....	40 off

Additional discount of 15 for full containers.

Hexagon Cap Screws

Upset 1-in. smaller (10-20 bright).....	56 off
Upset (10-35 heat treated)	
⅝ x 6	51 off
¾, ⅞, & 1 x 6	47 off

Square Head Set Screws

Upset 1-in. and smaller	61 off
Headless, ¼-in. and larger	46 off
No. 10 and smaller	56 off

Rivets

Fob Pittsburgh, Cleveland, Chicago Birmingham

Structural	5.25c
Lebanon, Pa.	5.40c
⅞-in. and under	55-5 off
Lebanon, Pa.	55-5 off plus 15c per cwt.

Washers, Wrought

Fob Pittsburgh, Chicago, Philadelphia, to jobbers and large nut and bolt manufacturers, lcl ..... $1.50-$2.00 off

Tool Steels

Tool Steel: Pittsburgh, Bethlehem, Syracuse, Canton, O., Dunkirk, N. Y., base, cents per lb; reg. carbon 16.00-17.00c; extra carbon 20.00c; special carbon 24.00c; oil-hardening 26.00c; high carbon-chromium 47.00c.

W	Cr	V	Mo	Base, per lb
18.00	4	1	.	82.00c
1.5	4	1	8.5	59.00c
12	3	0.50	.	67.00c
6.40	4.15	1.90	5	63.00c
5.50	4.50	4	4.50	80.00c

Stainless Steels

Base, Cents per lb

Grade	Bars, Drawn Wire, Structurals	Plate	Sheets	Hot Rolled Strip	Cold Rolled Strip
CHROMIUM NICKEL STEELS					
301....	26.00c	29.50c	37.00c	22.00c	28.00c
302....	26.00	29.50	37.00	23.50	30.50
303....	28.50	31.50	39.00	29.50	36.00
304....	27.50	31.50	39.00	25.50	32.50
308....	31.50	37.00	44.50	31.00	38.00
309....	39.00	43.50	51.00	40.50	51.00
310....	53.50	56.50	57.50	53.00	61.00
316....	43.50	48.00	52.00	43.50	52.00
321....	31.50	37.00	44.50	32.00	41.50
347....	36.00	41.50	49.00	36.00	45.50
431....	21.00	24.00	31.50	19.00	24.50
440A..	26.00	31.00	36.50	26.00	30.50
STRAIGHT CHROMIUM STEEL					
403....	23.50	27.00	32.00	23.00	29.50
410....	20.50	23.50	29.00	18.50	24.00
416....	21.00	24.00	29.50	20.00	25.50
420....	26.00	31.00	36.50	26.00	39.50
430....	21.00	24.00	31.50	19.00	24.50
430F..	21.50	24.50	32.00	20.50	27.00
442....	24.50	28.00	35.50	26.00	35.00
443....	24.50	28.00	35.50	26.00	35.00
446....	30.00	33.00	39.50	38.00	56.50
•501...	9.00	13.00	17.50	13.00	18.50
•502...	10.00	14.50	18.50	14.50	19.50
†STAINLESS CLAD STEEL (20%)					
304....	....	24.00	22.00	....	....
410....	....	22.00	20.00	....	....
430....	....	22.50	20.50	....	....
446....	....	29.00	27.00	....	..

* Low chromium. † Fob Pittsburgh and Washington, Pa.; plate prices include annealing and pickling.

RAW MATERIAL AND FUEL PRICES

Minimum delivered prices do not include 3 per cent federal tax.

PIG IRON

Per Gross Ton	No. 2 Foundry	Basic	Bessemer	Malleable
Bethlehem, Pa., base	$37.50	$37.00	$38.50	$38.00
Newark, N. J., del.	39.34	38.84	40.34	39.84
Brooklyn, N. Y., del.	40.50	....	....	41.00
Philadelphia, del.	39.22	38.72	40.22	39.72
Birdsboro, Pa., base	40.50	40.00	41.50	41.00
Birmingham, base	33.38*	32.88*	....	....
Baltimore, del.	39.78	....	....	....
Chicago, del.	37.12	....	....	....
Cincinnati, del.	38.25	....	37.75	....
Newark, N. J., del.	39.46	....	....	....
Philadelphia, del.	38.84	....	....	....
St. Louis, del.	37.37	....	36.87	....
Buffalo, base	36.00	35.50	37.00	36.50
Boston, del.	42.48	41.98	43.48	42.98
Rochester, del.	37.84	37.34	38.84	38.34
Syracuse, del.	38.50	38.00	39.50	39.00
Canton, Massillon, O., base	36.00	35.50	....	36.50
Chicago, base	36.00	35.50	37.00	36.50
Milwaukee, del.	37.32	36.82	38.32	37.83
Muskegon, Mich., del.	39.83	....	....	40.33
Cleveland, fob furnace	36.00	35.50	37.00	36.50
Akron, del.	37.67	37.17	38.67	38.17
Duluth, base	36.50	36.00	37.50	37.00
Erie, Pa., base	36.00	35.50	37.00	36.50
Everett, Mass., base	45.00	....	....	45.50
Granite City, Ill., base	37.00	36.50	....	37.00
St. Louis, del.	37.75	37.25	....	37.75
†Neville Island, Pa., base	36.50	36.00	37.00	36.50
Pittsburgh, del., N. & S. Sides	37.33	36.83	37.83	37.33
Provo, Utah, base	37.50	37.00	....	....
Seattle, Tacoma, Wash., del.	41.60	....	....	....
Portland, Oreg., del.	41.60	....	....	....
Sharpsville, Pa., base	36.50	36.00	37.00	36.50
Steelton, Pa., base	37.50	37.00	38.50	38.00
Struthers, O., base	37.00	36.50	37.50	37.00
Swedeland, Pa., base	41.50	41.00	42.50	42.00
Troy, N. Y., base	38.00	37.50	39.00	38.50
Toledo, O., base	36.00	35.50	37.00	36.50
Cincinnati, del.	39.50	39.00	....	....
Youngstown, O., base	36.50	36.00	37.00	36.50
Mansfield, O., del.	39.48	38.98	39.98	39.48

† To Neville Island base add: 66c for McKees Rocks, Pa., $1.01 Lawrenceville, Homestead, McKeesport, Ambridge, Monaco, Aliquippa; 97c (water), Monongahela; $1.33, Oakmont, Verona; $1.49 Brackenridge.
* Republic Steel Corp. quotes $3 higher, effective Aug. 13, 1947.

Blast Furnace Silvery Pig Iron

6.00-6.50 per cent (base) $45.50
6.51-7.00..$46.75 9.01- 9.50. 53.00
7.01-7.50.. 48.00 9.51-10.00. 54.25
7.51-8.00.. 49.25 10.01-10.50. 55.50
8.01-8.50.. 50.50 10.51-11.00. 56.75
8.51-9.00.. 51.75 11.01-11.50. 58.00

Fob Jackson, O., per gross ton; Buffalo base $1.25 higher. Buyer may use whichever base is more favorable.

Bessemer Ferrosilicon

Prices same as for high silicon silvery iron, plus $1 per gross ton.

Electric Furnace Silvery Pig Iron: Si 14.01-14.50%, $66.75, Jackson, O.; $70, Niagara Falls; $74, piglets, $72, open-hearth and foundry grade, Keokuk, Iowa. Add $1 a ton for each additional 0.5% Si to 18%; 50c for each 0.5% Mn over 1%; $1 a ton for 0.045% max. phos.

Charcoal Pig Iron

Semi-cold blast, low phosphorus. Fob furnace, Lyles, Tenn.....$44.00 (For higher silicon irons a differential over and above the price of base grade is charged as well as for the hard chilling iron, Nos. 5 and 6.)

Gray Forge

Neville Island, Pa. $36.00

Low Phosphorus

Steelton, Pa., Buffalo, Troy, N. Y., $42.00; Birdsboro, Pa., $45 base; Philadelphia, $44.22, del. Intermediate phosphorus, Central furnace, Cleveland, $39.00.

Differentials

Basing point prices are subject to following differentials:

Silicon: An additional charge of 50 cents a ton for each 0.25 per cent silicon in excess of base grade (1.75% to 2.25%).

Phosphorus: A reduction of 38 cents a ton for phosphorus content of 0.70 per cent and over.

Manganese: An additional charge of 50 cents a ton for each 0.50 per cent, or portion thereof, manganese in excess of 1%.

Nickel: An additional charge for nickel content as follows: Under 0.50%, no extra; 0.50% to 0.74%, inclusive, $2 a ton; for each additional 0.25% nickel, $1 a ton.

Metallurgical Coke

Price Per Net Ton

Beehive Ovens

Connellsville, furnace	$11.50-$12.50
Connellsville, foundry	14.00- 15.00
New River, foundry	12.50
Wise county, foundry	11.15
Wise county, furnace	10.65

Oven Foundry Coke

Kearney, N. J., ovens	$15.35
Chicago, outside del.	17.50
Chicago, del	18.50
Terre Haute, del.	18.05
Milwaukee, ovens	18.25
New England, del.	17.25
Birmingham, del.	15.00
Indianapolis, ovens	17.00
Cincinnati, del.	16.50
Ironton, O., ovens	15.50
Painesville, ovens	16.60
Cleveland, del.	17.90
Buffalo, del.	18.25
Detroit, del.	17.65
Philadelphia, ovens	15.50
Swedeland, Pa., ovens	15.50
Portsmouth, O., ovens	16.00
Fairmont, W. Va., ovens	15.75
Pittsburgh, del.	17.61

Coal Chemicals

Spot, gal. freight allowed east of Omaha. Effective as of Apr. 1, 1947.

Pure and 90% benzol	19.00c
Toluol, two degrees	23.00c
Industrial xylol	23.00c
Solvent naphtha	26.00c

Per pound fob works

Phenol (car lots, returnable drums)	11.25c
Do., less than carlots	12.00c
Do., tank cars	10.25c

Eastern plants, per pound

Naphthalene flakes, balls, bbl, to jobbers, "house-hold use"	9.50c

Per ton, bulk, fob plants

Sulphate of ammonia	$30.00

Refractories

Per 1000, fob shipping point Net Prices

Fire Clay Brick

Super Duty

Pa., Mo., Ky.	$87.00

High Heat Duty

Pa., Ill., Md., Mo., Ky.	70.00
Ala., Ga.	70.00
N. J.	75.00

Intermediate Heat Duty

Ohio	64.00
Pa., Ill., Md., Mo., Ky.	64.00
Ala., Ga.	56.00
N. J.	67.00

Low Heat Duty

Pa., Md., Ohio	56.00

Ladle Brick

(Pa., O., Va., Mo.)

Dry Press	47.00
Wire Cut	45.00

Malleable Bung Brick

All bases	80.00

Silica Brick

Pennsylvania	70.00
Joliet, E. Chicago	79.00
Birmingham, Ala.	70.00

Magnesite

Domestic dead-burned grains, net ton, fob Chewelah, Wash., Bulk	24.00
Single bags	28.00

Basic Brick

Net tons, fob Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick	59.00
Chem. bonded chrome	59.00
Magnesite brick	81.00
Chem. bonded magnesite	70.00

Ores

Lake Superior Iron Ore

Gross ton, 51½% (Natural) Lower Lake Ports

Old range bessemer	$5.95
Old range nonbessemer	5.80
Mesabi bessemer	5.70
Mesabi nonbessemer	5.55
High phosphorus	5.55

Eastern Local Ore

Cents, units, del. E. Pa.

Foundry and basic 56-63% contract	15.25

Foreign Ore

Cents per unit, cif Atlantic ports

No. African low phos.	Nom.
Swedish basic, 60 to 68%	13.50
Spanish, No. African basic, 50 to 60%	Nom.
Brazil iron ore, 68-69% fob Rio de Janeiro, nom.	5.50-6.50

Tungsten Ore

Wolframite and scheelite per short ton unit, duty paid	$32-$34

Manganese Ore

46-50%, duty paid, fob cars, New York, Philadelphia, Baltimore, Norfolk, Va., Mobile, Ala., New Orleans, 63.00c-67.00c.

Chrome Ore

Gross ton fob cars, New York, Philadelphia, Baltimore, Charleston, S. C., Portland, Oreg., or Tacoma, Wash.

(S S paying for discharge; dry basis, subject to penalties if guarantees are not met.)

Indian and African	
48% 2.8:1	$37.50
48% 3:1	39.00
48% no ratio	31.00
South African (Transvaal)	
44% no ratio	$27-$27.50
45% no ratio	28.00
48% no ratio	30.00
50% no ratio	31.00
Brazilian—nominal	
44% 2.5:1 lump	$33.65
48% 3:1 lump	43.50
Rhodesian	
45% no ratio	$27-$27.50
48% no ratio	30.00
48% 3:1 lump	39.00
Domestic (seller's nearest rail)	
48% 3:1	$39.00

Molybdenum

Sulphide conc., lb., Mo. cont., mines	$0.75

Fluorspar

Metallurgical grade, fob shipping point in Ill., Ky., net tons, carloads, effective CaF_2 content, 70% or more, $33; 65% to 70%, $32; 60% to 65%, $31; less than 60%, $30.

HIGH-STRENGTH—LOW ALLOY STEELS

Prices in dollars per 100 pounds

	Pittsburgh	Chicago	Gary	Youngstown	Sparrows Point	Buffalo	Bethlehem	Canton	Massillon
Sheets, Hot-Rolled	4.30	4.30	4.30	4.30	4.30	4.30	...	...	...
Cold-Rolled	5.30	5.30	5.30	5.30	...	5.30	...	...	...
Galvanized	5.85	...	...	...	...	...	...	...	...
Strip, Hot-Rolled	4.30	4.30	4.30	4.30	...	...	...	...	...
Cold-Rolled	5.10	5.10	5.10	5.10	...	...	...	...	...
Shapes Structural	4.30	4.30	...	4.30	...	...	4.30	...	...
Plates	4.55	4.55	4.55	...	4.55	...	...	...	...
Bars, Small Shapes	4.45	4.45	4.45	4.45	...	4.45	...	4.45	4.45

WAREHOUSE STEEL PRICES

Prices, cents per pound, for delivery within switching limits, subject to extras.

	SHEETS					STRIP		BARS				PLATES	
	H-R 10G	C-R 10G	C-R 17G	Gal. *10G	Gal. *24G	†H-R	†C-R	H-R Rds. ¾" to 8"	C-F Rds. ½"& up	H-R Alloy ($4140)	Structural Shapes	Carbon ¾"-¾"	Floor ¾" & Thicker
††New York (city)	4.87	6.07	5.77[8]	6.07	7.32	4.97	....	4.97	5.52	6.97[9]	4.72	5.02	6.70
New York (country)	4.72	5.92	5.62[8]	5.92	7.17	4.82	....	4.82	....	....	4.57	4.87	6.55
Philadelphia (city)	4.64	6.23[9]	5.83[9]	5.84	7.09	4.73	5.63	4.78	5.48	6.92[9]	4.52	4.79	6.13
Philadelphia (country)	4.54	6.13[9]	5.73[9]	....	....	4.63	5.53	4.68	....	6.82[9]	4.42	4.69	6.03
Baltimore (city)	4.29†	5.85[8]†	5.55[8]†	5.54	6.79	4.70	....	4.75	5.45	....	4.64	4.74	6.20
Baltimore (country)	4.19†	5.75[8]†	5.45[8]†	5.35	6.60	4.60	....	4.65	....	....	4.54	4.64	6.10
Washington (city)	4.75	....	....	....	....	4.95	....	5.00	5.60[12]	....	4.90	4.95	6.60
Washington (country)	4.65	....	....	....	....	4.85	....	4.90	....	....	4.80	4.85	6.50
Norfolk, Va.	4.75	....	....	....	....	....	....	5.05	5.85	....	5.00	5.00	5.00
Memphis, Tenn. (city)	4.82§§	....	5.88	6.37	....	5.02	....	4.97	5.98	....	4.97	5.17	6.88
Memphis, Tenn. (country)	4.72§§	....	5.78	6.27	....	4.92	....	4.87	5.88	....	4.87	5.07	6.78
Buffalo (city)	4.45	....	5.20[6]	5.90	....	4.60	5.60	4.40	5.10	8.15	4.40	4.85	6.20
Buffalo (country)	4.30	....	5.05[6]	5.75	....	4.45	5.45	4.25	4.95	8.00	4.25	4.70	6.05
Pittsburgh (city)	4.40§§	....	5.25[8]†	5.65	6.90	4.50	5.50	4.55	5.25	7.05	4.55	4.75	6.10
Pittsburgh (country)	4.25§§	....	5.10[8]†	5.50	6.75	4.35	5.35	4.40	5.10	6.90	4.40	4.60	5.95
Cleveland (city)	4.45	5.50[8]	5.20[8]	5.638	6.888	4.488	5.35	4.40	5.10	6.908	4.611	4.55	6.111
Cleveland (country)	4.30	5.35[8]	5.05[8]	....	....	....	5.20	4.25	4.95	....	....	4.40	....
Cincinnati (city)	4.671	5.516[8]	....	5.716	6.466	4.694	....	4.703	5.353	....	4.744	4.903	6.244
Chicago (city)	4.45	5.50[8]	5.20[8]	5.65	6.90	4.35	5.35	4.40	5.10	6.65[12]	4.40	4.60	6.05
Chicago (country)	4.30	5.35[9]	5.05[8]	5.50	6.75	4.20	5.20	4.25	4.95	6.65[12]	4.25	4.45	5.90
Milwaukee	4.599	5.649[8]	5.349[8]	5.799	7.049	4.499	5.499	4.549	5.249	6.949[12]	4.549	4.749	6.199
St. Louis	4.749	5.799[9]	5.499[5]	5.974	7.224	4.649	5.774	4.699	5.424[12]	7.124	4.699	4.899	6.349
Birmingham (city)	4.45[20]	....	....	5.80	....	4.45[20]	....	4.40[20]	....	....	4.40	4.65	6.86
Birmingham (country)	4.30[20]	....	....	5.50	....	4.30[20]	....	4.25[20]	....	....	4.25	4.50	....
New Orleans	4.98[20]**	....	6.29[18]	....	....	5.18[20]	....	5.13[20]**	6.29[11]	....	5.03[20]**	5.33[20]	7.29[20]
Omaha, Nebr.	5.068	....	....	6.468	7.718	5.168	....	5.218	5.918	..	5.218	5.418	6.868
Seattle, Tacoma, Wash.	5.30[17]	....	7.10[5]	6.70	....	5.60[17]	....	5.30[17]	7.45[10]	8.50[12]	5.25[17]	5.45	7.55[17]

Base Quantities: 400 to 1999 lb except as noted: Cold-rolled strip, 2000 lb and over, cold finished bars, 1000 lb and over; galvanized sheets, 450 to 1499 lb; [1]—any quantity; [2]—300 to 1999 lb; [3]—150 to 2249 lb; [4]—three to 24 bundles; [5]—450 to 1499 lb; [6]—one bundle to 1499 lb; [7]—one to nine bundles; [8]—400 to 1499 lb; [9]—1000 to 1999 lb; [10]—450 to 39,999 lb; [11]—1000 to 39,999 lb; [12]—1000 lb and over; [13]—400 to 14,999 lb; [14]—400 to 39,999; [15]—2000 lb and over; [16]—1000 to 4999; [17]—300 to 9999 lb; [18]—1500 to 1999 lb; [19]—1500 to 39,999; [20]—400 to 3999 lb; [21]—400 lb and over.

* Includes gage and coating extra, except Birmingham (coating extra excluded); † does not include gage extras; ‡ 15 gage; § as rolled, except Indianapolis, Los Angeles, San Francisco where price represents annealed bars; ** add 0.46 for sizes not rolled in Birmingham; †† same prices quoted for Jersey City, N. J.; ‡‡ add 15c for 100 lb for slow moving items; §§ 18 gage and heavier.

PRICES OF LEADING FERROALLOYS PRODUCTS

Spiegeleisen: 19-21% Mn, 1-3% Si, carlot per gross ton, $47, Palmerton, Pa., $51, Pittsburgh. 16% to 19% Mn., $46, Palmerton, $50, Pittsburgh.

Ferromanganese, standard: 78-82% c.l. gross ton, duty paid, $135 fob cars, Baltimore, Philadelphia or New York, whichever is most favorable to buyer, Birmingham, Ala. (where Sloss-Sheffield Steel & Iron Co. is producer); $140.25 fob cars, Pittsburgh, including 75c switching charge, (where Carnegie - Illinois Steel Corp. is producer); add $8 for packed c.l., $10 for ton, $13.50 for less ton; $1.70 for each 1%, or fraction contained manganese over 82% or under 78%.

Ferromanganese, low carbon: Eastern zone: Special, 21c; regular, 20.50c; medium, 14.50c; central zone: Special, 21.30c; regular, 20.80c; medium, 14.80c; western zone: Special, 21.30c; regular, 21.20c; medium, 15.20c. Prices are per pound contained Mn, bulk carlot shipments, fob shipping point, freight allowed. Special low-carbon has content of 90% Mn, 0.10% C, and 0.06% P.

Ferromanganese Briquets: (Weight approx. 3 lb and containing exactly 2 lb Mn). Prices per lb of briquets: Contract, bulk, carlots, 7.00c, packed, carlots, 7.60c, ton lots, 8.00c, smaller lots 8.40c, eastern, freight allowed; 7.25c, 7.85c, 8.60c and 9.00c, central; 7.80c, 8,40c, 10.50c and 10.90c, western; spot up 0.25c; notched, up 0.25c.

Ferrotungsten: Spot, 10,000 lb or more, per lb contained W, $2.32; contract, $2.25; freight allowed as far west as St. Louis.

Ferrotitanium: 40-45%, R.R. freight allowed, per lb contained Ti; ton lots $1.23; smaller lots $1.25; eastern. Spot up 5c per lb.

Ferrotitanium: 20-25%, 0.10 maximum C; per lb contained Ti; ton lots $1.35; smaller lots $1.40 eastern. Spot up 5c per lb.

Ferrotitanium, High - Carbon: 15-20% contract basis, per net ton, fob Niagara Falls, N. Y., freight allowed to destination east of Mississippi river and north of Baltimore and St. Louis, 6.8% C, $142.50; 3-5% C, $157.50.

Ferrovanadium: V 0.35-0.55%, contract basis, per lb contained V, fob producers plant with usual freight allowances; open-hearth grade $2.70; special grade $2.80; highly-special grade $2.90.

Ferromolybdenum: 55-75% per lb, contained Mo, fob Langeloth and Washington, Pa., furnace, any quantity 95.00c.

Ferrophosphorus: 17-19%, based on 18% P content with unitage of $3 for each 1% of P above or below the base; gross tons per carload fob sellers' works, with freight equalized with Rockdale, Tenn.; contract price $58.50, spot $62.25.

Ferrosilicon: Contract, lump, packed; eastern zone quotations: 90-95% c.l. 13.80c, ton lots 14.30c, smaller lots 14.80c; 75%, c.l. 11.05c, ton lots 11.65c, smaller lots 12.25c; 50%, c.l. 9.00c, ton lots 9.65c, smaller lots 10.30c. Deduct 1.00c for bulk, carlots, 80-90% and 90-95%; 1.05c, 75%; 1.20c, 50%. Prices are fob shipping point, freight allowed, per lb of contained Si. Spot prices 0.25c higher on 80-90%, 0.30c on 75%, 0.45c on 50%.

Ferroboron: (B 17.50% max. and C 1.50% max., Al 0.50% max. and C 0.50% max.) Prices per lb of alloy, contract, ton lots $1.20, smaller lots $1.30, eastern, freight allowed; $1.2075 and $1.3075 central; $1.229 and $1.329, western; spot add 5c.

Ferrocolumbium: 50-60%, per lb contained columbium in gross ton lots, contract basis, R. R. freight allowed, eastern zone, $2.50; smaller lots $2.55. Spot up 10c.

Ferrochrome: Contract, lump, packed; **high carbon,** eastern zone, c.l. 16.20c, ton lots 16.80c; central zone, add 0.40c and 1.30c; western zone, add 0.55c and 2.10c. Deduct 0.60c for bulk carlots. **High carbon, high nitrogen,** add 5c to all high carbon ferrochrome prices. Deduct 0.55c for bulk carlots. Spot prices up 0.25c. **Low carbon,** eastern zone, bulk, c.l., max. 0.06% C 23c; 0.1% 22,50c, 0.15% 22.00c, 0.2% 21.75c; 0.5% 21.50c, 1% 21.00c, 2% 20.50c; add 1.35c for 2000 lb to c.l.; central zone, add 0.4c for bulk, c.l.; and 0.65c for 2000 lb to c.l.; western zone, add 0.5c for bulk, c.l., and 1.85c for 2000 lb to c.l.; carlot packed differential 0.80c. Prices are per lb of contained Cr, freight allowed.

Low carbon, high nitrogen: Add 2c to low carbon ferrochrome prices. For higher nitrogen low carbon, add 2c for each 0.25% of nitrogen over 0.75%.

Ferrochrome, Special Foundry: (Cr 62-66%, C above 5-7%.) Contract, 2-inch x D, packed, eastern zone, freight allowed, c.l. 17.05c, ton lots 17.60c, smaller lots 18.30c; central zone, add 0.40c for c.l. and 1.30c for smaller lots; western zone, add 0.55c for c.l. and 2.10c for smaller lots. Deduct 0.60c for bulk carlots.

S. M. Ferrochrome, high carbon: (Cr 60-65%, Si, Mn and C 4-6% each.) Contract, lump, packed, eastern zone, freight allowed, c.l. 17.30c, ton lots 17.90c, smaller lots 18.60c; central zone, add 0.40c for c.l. and 1.30c for smaller lots; western zone, add 0.55c for c.l. and 2.10c for smaller lots. Prices are per pound of contained chromium, spot prices 0.25c higher. Deduct 0.60c for bulk carlots.

S. M. Ferrochrome, low carbon: (Cr 62-66%, Si 4-6%, Mn 4-6% and C 1.25% max.) Contract, carlot, bulk 21.00c; packed carlot 21.80c, ton lots 22.35c, smaller lots 23.35c, eastern, freight allowed, per pound of contained Cr; 21.40c, 22.20c, 23.00c, and 24.00c, central; 21.50c, 22.30c, 24.20c and 25.20c, western spot up 0.25c.

Ferrochrome Briquets: Containing exactly 2 lb Cr, packed eastern zone, c.l. 10.35c, ton lots 10.75c, smaller lots 11.15c; central zone, add 0.25c for c.l. and 0.90c for smaller lots; western zone, add 0.55c for c.l. and 2.10c for smaller lots. Deduct 0.50c for bulk carlots. Prices per pound of briquets, spot prices 0.25c higher; notched 0.25c higher.

Chromium Metal: 97% min. Cr, max, 0.50% C, eastern zone, per lb contained Cr bulk, c.l. 79.50c, 2000 lb c.l. 80c; central 81c and 82.60c; western 82.25c and 84.75c, fob shipping point, freight allowed.

Chromium-Copper: (Cr 8-11%, Cu 88-90%, Fe 1% max., Si 0.50% max.) Contract, any quantity, 45c, eastern, Niagara Falls, N. Y., basis, freight allowed to destination, except to points taking rate in excess of St. Louis rate to which equivalent of St. Louis rate will be allowed; spot up 2c.

Calcium metal; cast: Contract, ton lot or more, $1.60; 100 to 1999 lb, $1.95; less than 100 lb, $3.15 per lb of metal, eastern zone; $1.615, $1.965 and $3.185, western; spot up 5c.

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%), per lb of alloy. Contract, carlots, packed, 16.10c, ton lots 17.60c, smaller lots 18.60c, eastern, freight

allowed; 16.60c, 18.45c, 19.45c, central; 18.65c, 20.20c, 21.20c, western; spot up 0.25c.

Calcium - Silicon: (Ca 30-35%, Si 60-65% and Fe 3.00% max.), per lb of alloy. Contract, lump, packed, carlots 14.60c, ton lots 16.10c, smaller lots 17.10c, eastern, freight allowed; 15.10c, 16.85c, 17.85c, central; 17.15c, 19.00c, 20.00c, western; spot up 0.25c.

Silicon Metal: Min. 97% Si and max. 1% Fe, eastern zone, bulk, c.l. 14.50c; 2000 lb to c.l. 16.00c; central zone, 15.10c and 18.25c; western, 15.70c and 20.00c; min. 96% Si and max. 2% Fe, eastern, bulk, c.l., 14.10c; 2000 lb to c.l. 15.60c; central, 14.70c and 17.85c; western, 15.30c and 19.60c, fob shipping point, freight allowed. Price per lb contained Si.

Silicomanganese Briquets: Containing exactly 2 lb Mn and about ½ lb Si, eastern zone, bulk, c.l. 6.75c, ton lots 7.75c; central zone, add 0.25c for c.l. and 0.60c for ton lots; western, add 0.80c for c.l. and 2.50c for ton lots. Notched, up 0.25c.

Silicon Briquets: Weighing about 5 lb and containing exactly 2 lb Si, packed, eastern zone, c.l. 4.70c, ton lots 5.10c, smaller lots 5.50c; weighing about 2½ lb and containing 1 lb Si, packed, eastern zone, c.l. 4.85c, ton lots 5.25c, smaller lots 5.65c; notched 0.25c higher; central zone, add 0.25c for c.l. and 0.60c for smaller lots; western zone, add 0.45c for c.l. and 0.90c for smaller lots. Prices are fob shipping point, freight allowed; spot prices 0.25c higher. Deduct 0.50c for bulk carlots.

Manganese Metal: (Min. 96% Mn., max. 2% Fe), per lb of metal, eastern zone, bulk, c.l. 30c, 2000 lb to c.l., 32.00c; central 31.00c and 33.45c; western, 31.45c and 34.40c.

Electrolytic Manganese: 99.9% plus, fob Knoxville, Tenn., freight allowed east of Mississippi on 250 lb or more: Carlots 32c, ton lots 34c, drum lots 36c, less than drum lot 38c. Add 1½c for hydrogen-removed metal.

Manganese-Boron: (Mn 75% approx., B 15-20%, Fe 5% max., Si 1.50% max. and C 3% max.) Prices per lb of alloy. Contract, ton lots $1.89, less $2.01, eastern, freight allowed; $1.903 and $2.023, central; $1.935 and $2.055, western; spot up 5c.

Nickel-Boron: (B 15-18%, Al 1% max., Si 1.50% max., C 0.50% max., Fe 3% max., Ni, balance). Prices per lb of alloy: Contract, 5 tons or more $1.90, 1 ton to 5 tons $2.00, smaller lots $2.10, eastern, freight allowed; $1.9125, $2.0125 and $2.1125, central; $1.9445, $2.0445 and $2.1445, western; spot same as contract.

Borosil: 3 to 4% B, 40 to 45% Si; $6.25 per lb contained B, fob Philo, O., freight not exceeding St. Louis rate allowed.

Bortam: B 1.5-1.9%, ton lots, 45c per lb; smaller lots, 50c per lb.

Carbortam: B 0.90 to 1.15% net ton to carload, 8c per lb, fob Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

Silicaz Alloy: (Si 35-40%, Ca 9-11%, Al 5-7%, Zr 5-7%, Ti 9-11% and B 0.55-0.75%) Prices per lb of alloy, contract, or spot carlots 35.00c, ton lots 37.00c, smaller lots 39.00c, eastern, freight allowed; 35.30c, 38.10c and 40.10c, central; 35.30c, 40.05c and 42.05c, western; spot up 0.25c.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7% and Fe approx. 20%) Price per lb of alloy, contract, carlots 13.50c, ton lots 14.25c, smaller lots 15.00c, eastern zone, freight allowed; 13.80c, 15.35c, 16.10c, central; 13.80c, 17.30c, 18.05c, western; spot up 0.25c.

CMSZ Alloys 4 & 5: (Alloy 4—Cr 45-59%, Mn 4-6%, Si 18-21%, Zr 1.25-1.75%, C 3.00-4.50%; alloy 5—Cr 50-56%, Mn 4-6%, Si 13.50-16.00%, Zr 0.75-1.25%, C 3.50-5.00%). Prices per lb of alloy, contract or spot, bulk, carlots 14.50c; packed, carlots 15.25c, ton lots 16.00c, smaller lots 16.75c, eastern, freight allowed; 14.80c, 15.55c, 17.10c, 17.85c, central; 14.80c, 15.55c, 19.05c, 19.80c, western.

Zirconium alloy: 12-15%, per lb of alloy, eastern, contract, bulk, carlots 5.50c, packed, carlots 6.05c, ton lots 6.40c, smaller lots 6.75c; spot up 0.25c.

Zirconium alloy: Z 35-40%, eastern, contract, packed, carlots 17.00c, ton lots 17.75c, smaller lots 19.00c; spot up 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe) Contract basis fob Niagara Falls, N. Y., lump per lb carlots 6.50c; ton lots packed, 7.00c; 200 to 1999 lb, 7.75c; smaller lots, 8.25c. Spot up ½c.

Simanal: (Approx. 20% each Si, Mn, Al) Packed, lump, carload 9c, ton lots 9.25c, smaller lots 9.75c per lb alloy; freight not exceeding St. Louis rate allowed.

Tungsten Metal Powder: Spot, not less than 98.8%, $3.05, freight allowed as far west as St. Louis.

Grainal: Vanadium Grainal No. 1 87.5c; No. 6, 60c; No. 79, 45c; all fob Bridgeville, Pa., usual freight allowance.

Vanadium Pentoxide, technical grade: Fused, approx. 89-92% V_2O_5 and 5.84% Na_2O; or air dried, 83-85% V_2O_5 and 5.15% Na_2O, $1.10 per lb contained V_2O_5 fob plant freight allowed on quantities of 25 lb and over to St. Louis.

Premium Price Plan for Metals Terminated

No shortage of zinc will develop despite closing of many marginal mines in Tri-State district

NEW YORK—President Truman vetoed last week the Allen bill (H.R. 1602) which would have subsidized the mining of copper, lead, zinc and manganese. In effect, this legislation authorized the Reconstruction Finance Corp. to reinstate subsidies for copper, lead and zinc that were in effect up to June 30, 1947. It added manganese to this list and called for an expenditure of $35 million a year in 1947 and in 1948. Payments were to make up the difference between the going market price for the metal and 28 cents in the case of copper, 18 cents for lead and 18 cents for zinc. Producers of manganese would have been guaranteed a return of $1 per unit of 22.4 pounds of contained metallic manganese ore.

After passage of the bill by Congress, plans had been made to resume production at several mines which had closed down when the old law expired. The veto is not expected to have any great effect on copper and lead production, since present prices for these metals would have required premium payments for little, if any, production.

The effect on zinc, however, may cause the continued suspension of those mines that had not resumed production. As far as mills that treat zinc concentrates are concerned, it may prove only a temporary setback. Industry members assert that supplies of foreign zinc concentrates may take up the slack left by the loss of high-cost domestic production.

Supplies of zinc are well in excess of consumption and many in the industry had been expressing concern over the stability of the 10.50-cent East St. Louis price. If the premium price plan had been made law, it was an open question whether an easier price trend might not have developed.

The Tri-State Zinc & Ore Producers Association said that in their district, where 25 per cent of all domestic zinc production originates, operations have almost been brought to a standstill and are not expected to return to more than 50 per cent of normal.

It was pointed out that lead, and in the western mines, copper, are almost invariably found in the same ores with zinc and that the mining of zinc is one of the greatest contributions to the lead and copper supply. In the Tri-State district, 8 per cent of all the lead produced in the United States is produced as a by-product of zinc.

"To produce one, increases the production of the other; to curtail production of one, curtails production of the other. In the Tri-State mines," the Association said, "mine production of lead will be curtailed in direct ratio to production of zinc. In the western mines often both copper and lead production will be curtailed along with zinc."

COPPER—Government's stockpile of copper dropped from 15,926 tons on May 31 to 13,850 tons on June 30. Mine production of recoverable copper in the United States amounted to 72,760 tons in June, which is about on a level with the high production rate of the preceding months, according to the Bureau of Mines. Total production for the first six months came to 433,014 tons compared with only 236,684 tons in the like 1946 period when the industry was plagued with strikes.

Deliveries of refined copper to domestic consumers in July amounted to 109,817 tons, according to the Copper Institute. This compares with 116,652 tons in June. Only 5398 tons were allocated in July from government stockpile against 7329 tons in June. Total refined copper output in July amounted to 94,605 tons against 103,448 tons in June. Stocks of refined copper at the end of July were 76,570 tons against 81,339 tons at the end of June.

LEAD—Total stocks of lead held in the government's stockpile as of June 30 amounted to only 8576 tons compared with 17,389 tons on May 31. Sellers are having no trouble in disposing of their quotas, although interest in September metal is described as light, due in part to the fact that some consumers' plants are closed for vacation purposes.

ZINC—The amount of zinc in the government stockpile as of June 30 has been reported as 157,652 tons of metal and 471,486 tons of ores and concentrates. This compared with the May 31 total of 155,435 tons and 567,000 tons, respectively.

Domestic mine production of recoverable zinc during June reached a new high for the year at 59,762 tons compared with 42,665 tons during June of last year. Total for the first six months came to 335,139 tons against 290,160 tons for the like period in 1946. In the first half of last year 188,040 tons, or about 65 per cent of the total production, drew premium payments under the Premium Price Plan. The over-ceiling payments on these 188,040 tons amounted to $18,636,563, or an average of slightly under 5 cents a pound. The average of the premium priced zinc was 13.25c, or 2.75 cents over the present market price of 10.50c.

The prospect of some loss in domestic production does not appear to have stimulated demands in any direction with the smelters currently turning out as much or more zinc as is required for home and export account. With stocks of some 183,000 tons of metal and double that amount of metal in ore, a shortage in zinc supplies is not probable.

TIN—The amount of pig tin held by the Office of Metals Reserve increased 30 tons during June to a total of 16,774 tons while the amount of tin in concentrates declined 4345 tons to 17,150 tons.

SILVER—A tightening in silver supplies, plus a fairly good demand last week resulted in an advance in Handy & Harman's official price to 64.75c an ounce.

NONFERROUS METAL PRICES

Copper: Electrolytic, carlots 21.50c, delivered Conn.; Lake, 21.62½c, del. Conn. Dealers may add ¾c for 5000 lb to carload; 1c, 1000-4999 lb; 1½c, 500-999 lb; 2c, 0-499 lb. Casting, nom., refinery, 20,000 lb or more; nom., less than 20,000 lb.

Brass Ingot: 85-5-5-5 (No. 115) 19.00c; 88-10-2 (No. 215) 27.25c; 80-10-10 (No. 305) 23.00c; No. 1 yellow (No. 405) 15.25c; carlot prices, including 25c per 100 lb freight allowance; add ¼c for less than carloads.

Zinc: Prime western 10.50c, brass special 10.75c, intermediate 11.00c, E. St. Louis; high grade 11.50c, del., carlots. For 20,000 lb to carlots add 0.15c; 10,000-20,000 lb 0.25c; 2000-10,000 lb 0.4c; under 2000 lb 0.50c.

Lead: Common 14.80c-14.85c, chemical 14.90c, corroding 14.90c, E. St. Louis for carlots.

Primary Aluminum: 99% plus, ingots 15.00c del., pigs 14.00c del.; metallurgical 94% min. 13.50c del. Base 10,000 lb and over; add ½c 2000-9999 lb; 1c less through 2000 lb.

Secondary Aluminum: Piston alloy (No. 122 type) 14.00c; No. 12 foundry alloy (No. 2 grade) 13.75c; steel deoxidizing grades, notch bars, granulated or shot: Grade 1 (95-97½%) 14.50c; grade 2 (92-95%) 12.75c; grade 3 (90-92%) 12.00-12.25c; grade 4 (85-90%) 11.50-11.75c. Above prices for 30,000 lb or more; add ¼c 10,000-30,000 lb; ½c 5000-10,000 lb; ¾c 1000-5000 lb; 1¼c less than 1000 lb. Prices include freight at carload rate up to 75c per 100 lb.

Magnesium: Commercially pure (99.8%) standard ingots (4-notch, about 20 lb), 10,000 lb and over, 20.50c; 2000 to 9999 lb, 21.50c; 100 to 1999 lb, 22.50c. Extruded rounds, 12 inches long, 1.312 inches in diameter, less than 25 lb, 52.00c-56.00c; 25 to 99 lb, 42.00c-46.00c; 100 to 4000 lb, 35.00c-36.00c.

Tin: Prices ex-dock, New York in 5-ton lots. Add 1 cent for 2240-11,199 lb, 1½c 1000-2239, 2½c 500-999, 3c under 500. Grade A, 99.8% or higher (includes Straits), 80.00c; Grade B, 99.8% or higher, not meeting specifications for Grade A, with 0.05% max. arsenic, 79.85c; Grade C, 99.65-99.79% incl. 79.55c; Grade D, 99.50-99.64% incl., 79.40c; Grade E, 99-99.49% incl. 78.90c; Grade F, below 99% (for tin content), 78.70c.

Antimony: American bulk carlots fob Laredo, Tex., 99.0% to 99.8% and 99.8% and over but not meeting specifications below, 33.00c; 99.8% and over (arsenic, 0.05% max.; other impurities, 0.1% max.) 33.50c, effective as of Mar. 15. On producers' sales add ¼c for less than carload to 10,000 lb; ½c for 9999-224 lb; add 2c for 223 lb and less; on sales by dealers, distributors, and jobbers add ½c, 1c, and 3c, respectively.

Nickel: Electrolytic cathodes, 99.9%, base sizes at refinery, unpacked 35.00c lb; 25 lb pigs produced from electrolytic cathodes 36.50c lb; shot produced from electrolytic cathodes 37.50c lb; "F" nickel shots or ingots for additions to cast iron 35.50c lb. Prices include import duty.

Mercury: Open market, spot, New York, $84-$87 per 76-lb flask.

Arsenic: Prime, white, 99%, carlots, 4.00c lb

Beryllium-Copper: 3.75-4.25% Be, $17 per lb contained Be.

Cadmium: Bars, ingots, pencils, pigs, plates, rods, slabs, sticks, and all other "regular" straight or flat forms $1.75 lb. del.; anodes, balls, discs and all other special or patented shapes, $1.80.

Cobalt: 97-98%, $1.65 lb for 550 lb (keg); $1.67 lb for 100 lb (case); $1.72 lb under 100 lb.

Gold: U. S. Treasury, $35 per ounce.

Indium: 99.9%, $2.25 per troy ounce.

Silver: Open market, N. Y., 64.7c. per ounce.

Platinum: $53-$56 per ounce.

Palladium: $24 per troy ounce.

Iridium: $80-$90 per troy ounce.

Rolled, Drawn, Extruded Products

(Copper and brass products prices based on 21.50c, Conn., for copper. Freight prepaid on 100 lb or more.)

Sheet: Copper 33.68c; yellow brass 29.63c; commercial bronze, 95% 33.72c, 90% 33.11c, red brass, 85% 31.99c, 80% 31.38c; best quality 30.64c; Everdur, Duronze, Herculoy or equiv., cold-drawn, 38.46c; nickel silver, 18%, 42.49c; phosphor bronze, grade A, 5%, 52.00c.

Rods: Copper, hot rolled 30.03c, cold drawn 31.03c; yellow brass, free cutting, 24.39c; commercial bronze, 95% 33.41c, 90% 32.80c; red brass, 85% 31.68c, 80% 31.07c; best quality 30.33c.

Seamless Tubing: Copper 33.72c; yellow brass 32.39c; commercial bronze 90% 35.52c; red brass 85% 34.65c, 80% 34.04c; best quality brass 33.05c.

Wire: Yellow brass 29.92c; commercial bronze, 95% 34.01c, 90% 33.40c; red brass, 85% 32.28c, 80% 31.67c; best quality brass 30.93c.

Copper Wire: Bare, soft, fob eastern mills, carlots 27.72c, less carlots 28.22c; weatherproof, fob eastern mills carlots 28.12c, less carlots 28.62c; magnet, delivered, carlots 29.75c-31.13c, 15,000 lb or more 30.00c-31.38c, less carlots 30.50c-31.88c.

Aluminum Sheets and Circles: 2s and 3s flats, mill finish, base 30,000 lb or more, fob shipping point. Actual transportation charges (not to exceed lowest carload rail freight rate) are deducted on orders for domestic delivery of 500 lb or more of one product to one destination. Widths from 12 in. and diameters from 9 in. to indicated maximum sizes. Prices, cents per lb, effective Jan. 30, 1947.

B. & S. Gage	Max. Width or Diam.	Sheet Base	Circle Base
0.0249"-7	48"	23.70	26.20
8-10	48"	24.20	26.70
11-12	26"	24.70	27.50
13-14	26"	24.90	27.90
15-16	26"	25.10	28.20
17-18	26"	25.40	28.60
19-20	24"	25.70	29.00
21-22	24"	26.10	29.50
23-24	24"	26.60	30.20
25	24"	27.10	30.90
26	24"	27.80	31.90
27	24"	28.50	33.00
28	24"	29.20	33.70
29	24"	30.00	34.70
30	24"	30.80	35.80

Lead Products: Prices to jobbers: Sheets, full rolls, 140 sq ft or more, 18.25c; add per hundredweight, 25c, 80 to 140 sq ft; 50c, 20 to 80 sq. ft; 75c, 10 to 20 sq ft and circles.
Pipe: Full coils 17.50c; cut coils 17.75c.
Lead Traps and Bends: List plus 42%.

Zinc Products: Sheet, 15.50c, fob mill, 36,000 lb and over. Ribbon zinc in coils, 14.50c, fob mill, 36,000 lb and over. Plates, not over 12-in., 13.50c; over 12-in., 14.50c.

Plating Materials

Chromic Acid: 99.75%, flake, fob Philadelphia, carloads, 21.00c; 5 tons and over 21.50c; 1 to 5 tons, 22.00c; less than 1 ton, 22.50c.

Copper Anodes: Base, 2000 to 5000 lb; fob shipping point, freight allowed: Flat untrimmed, 30.59c; oval, 30.09c; electrodeposited, 29.84c; cast, 29.59c.

Copper Carbonate: 52-54% metallic Cu, 50 lb bags, 26.50c.

Copper Cyanide: 70-71% Cu, 100-lb drums, 45.00c fob Cleveland.

Sodium Cyanide: 96-98%, ½-oz ball, in 100 or 200 lb drums, 1 to 400 lb, 16.00c, 500 lb and over, 15.00c, fob Cleveland; 1 cent less, fob Niagara Falls.

Nickel Anodes: Rolled oval, carbonized, carloads, 48.00c; 10,000 to 30,000 lb, 49.00c; 3000 to 10,000 lb, 50.00c; 500 to 3000 lb, 51.00c; 100 to 500 lb, 53.00c; under 100 lb, 56.00c; add 1 cent for rolled depolarized.

Nickel Chloride: 100-lb kegs, 22.00c; 275-lb bbls, 20.00c.

Tin Anodes: Bar, 1000 lb and over 92.50c; 500 to 1000 lb, 93.00c; 200 to 500 lb, 93.50c; less than 200 lb, 95.00c; ball, 1000 lb and over, 94.75c; 500 to 1000 lb, 95.25c; 200 to 500 lb. 95.75c; less than 200 lb, 97.25c, fob Sewaren, N. J.

Tin Chloride: Fob Grasselli, N. J., 625 lb bbl., price on application.

Sodium Stannate: To all consumers: in 200 or 500 lb drums, 49.50c; 100 lb, 50.50c; 50 lb, 55.00c; 25 lb, 57.50c.
To consumers other than automobile, radio and refrigerator makers: 1500 lb, 45.85c; 600 to 1400 lb, 48.50c.
To automobile, radio and refrigerator makers: 10,000 lb and over, 44.50c; 2000 to 9999 lb. 45.50c; 1000 to 1999, 46.50c; 600 to 999 lb, 48.50c.

Zinc Cyanide: 100-lb drums 36.00c, fob Cleveland; 35.00c, fob Niagara Falls.

Scrap Metals

BRASS MILL ALLOWANCES

(Based on 21.50c, Conn., for copper)
Prices for less than 15,000 lb fob shipping point. Add ¾c for 15,000-40,000 lb; 1c for 40,000 or more.

	Clean Heavy	Rod Ends	Clean Turnings
Copper	19.125	19.125	18.375
Yellow brass	15.125	14.875	14.250
Commercial Bronze			
95%	18.000	17.750	17.250
90%	17.500	17.250	16.750
Red brass			
85%	17.250	17.000	16.500
80%	16.875	16.625	16.125
Best Quality (71-79%)	16.125	15.875	15.375
Muntz Metal	14.125	13.875	13.375
Nickel silver, 5%	16.125	15.875	8.063
Phos. bronze, A. B.	20.000	19.750	18.750
Naval brass	14.500	14.250	13.750
Manganese bronze	14.500	14.250	13.625

BRASS INGOT MAKERS BUYING PRICES

(Cents per pound, fob shipping point, carload lots)

No. 1 copper 17.50, No. 2 copper 16.50, light copper 15.50, composition red brass 13.25, auto radiators 10.25, heavy yellow brass 9.50, brass pipe 9.50.

REFINERS' BUYING PRICES

(Cents per pound, delivered refinery, carload lots)

No. 1 copper 18.00, No. 2 copper, 16.50- 16.75, light copper, 15.50-15.75, refinery brass (60% copper), per dry copper content less $5 smelting charge for brass analyzing 60 per cent or more, 13.62½.

DEALERS' BUYING PRICES

(Cents per pound, New York, in ton lots or more)

Copper and Brass: Heavy copper and wire, No. 1 16.00-16.50, No. 2 15.00, light copper 14.00; No. 1 composition red brass 12.00-12.25, No. 1 composition turnings 11.50-11.75, mixed brass turnings 7.00, new brass clippings 12.00-12.50, No. 1 brass rod turnings 10.50-11.00, light brass 6.00, heavy yellow brass 7.00, new brass rod ends 11.00-11.50, auto radiators, unsweated 9.00, cocks and faucets 9.00-9.50, brass pipe 9.00.

Lead: Heavy lead 11.50-12.00, battery plates 7.00, linotype and stereotype 12.25-12.50, electrotype 10.75-11.00, mixed babbitt 12.00, solder joints 15.50-16.00.

Zinc: Old zinc 5.00-5.50, new die cast scrap 3.75-4.00, old die cast scrap 3.00.

Tin: No. 1 pewter 50.00-52.00, block tin pipe 67.00-68.00, auto babbitt 40.00-42.00, No. 1 babbitt 40.00-43.00, siphon tops 40.00-42.00.

Aluminum: Clippings, 2S, 7.50-8.00, old sheets 6.00, crankcase 6.00, borings and turnings 2.00, pistons, free of struts, 5.00.

Nickel: Anodes 18.50-19.00, turnings 15.50-16.50, rod ends 18.00-19.00.

Monel: Clippings 13.00-14.00, turnings 7.50-8.00, old sheet 11.00-12.00, rods 11.50-12.50, castings 9.00.

OPEN MARKET PRICES, IRON AND STEEL SCRAP

Prices are dollars per gross ton, including broker's commission, delivered at consumer's plant except where noted.

PITTSBURGH

No. 1 Heavy Melt. Steel	$39.00-40.00
No. 2 Heavy Melt. Steel	39.00-40.00
No. 1 Busheling	39.00-40.00
Nos. 1, 2 and 3 Bundles	39.00-40.00
Machine Shop Turnings	33.00-34.00
Mixed Borings, Turnings	33.00-34.00
Short Shovel Turnings.	35.00-36.00
Cast Iron Borings	34.00-34.50
Bar Crops and Plate	47.00-48.00
Low Phos. Steel	47.00-48.00
Punchings & Plate Scrap	48.00-49.00
Cut Structurals	46.00-47.00
Elec. Furnace Bundles.	45.00-46.00
Heavy Turnings	37.50-38.50
No. 1 Chemical Borings	42.00-43.00

Cast Iron Grades

No. 1 Cupola	42.00-43.00
Charging Box Cast	51.00-52.00
Heavy Breakable Cast.	36.00-37.00
Stove Plate	35.00-36.00
Unstripped Motor Blocks	40.00-41.00
Malleable	52.00-53.00
Brake Shoes	37.00-38.00
Clean Auto Cast	43.00-44.00
No. 1 Wheels	43.50-44.00
Burnt Cast	34.00-35.00

Railroad Scrap*

No. 1 R.R. Heavy Melt.	43.00-43.50
R.R. Malleable	52.00-53.00
Axles	46.00-47.00
Rails, Rerolling	47.00-48.00
Rails, Random Lengths	44.00-44.50
Rails, 3 ft and under	47.00-47.50
Rails, 18 in. and under	48.00-49.00
Railroad specialties	48.00-48.50
Uncut Tires	47.00-48.00
Angles, Splice Bars	46.25-47.25

*Brokers buying prices.

CLEVELAND

No. 1 Heavy Melt. Steel	$38.00-38.50
No. 2 Heavy Melt. Steel	38.00-38.50
No 1 Busheling	38.00-38.50
Nos. 1 & 2 Bundles	38.00-38.50
Machine Shop Turnings	31.00-31.50
Mixed Borings, Turnings	31.50-32.00
Short Shovel Turnings.	32.00-32.50
Cast Iron Borings	32.00-32.50
Bar Crops and Plate	42.00-42.50
Cast Steel	46.00-47.00
Punchings & Plate Scrap	42.00-42.50
Heavy Turnings	37.00-37.50
Alloy Free Turnings	33.00-33.50
Cut Structurals	42.00-42.50

Cast Iron Grades

No. 1 Cupola	45.00-46.00
Charging Box Cast	43.00-44.00
Stove Plate	42.00-43.00
Heavy Breakable Cast.	41.00-42.00
Unstripped Motor Blocks	41.00-42.00
Malleable	56.00-57.00
Brake Shoes	42.00
Clean Auto Cast	50.00
No. 1 Wheels	45.00
Burnt Cast	42.00-43.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	39.50
R.R. Malleable	56.00-57.00
Rails, Rerolling	44.00-45.00
Rails, Random Lengths	44.00-45.00
Rails, 3 ft and under	48.00-49.00
Railroad Specialties	48.00-50.00
Uncut Tires	45.00-46.00
Angles, Splice Bars	49.00

VALLEY

No. 1 Heavy Melt. Steel	$40.00
No. 2 Heavy Melt. Steel	40.00
No. 1 Bundles	40.00
Machine Shop Turnings	34.00-35.00
Short Shovel Turnings.	35.00-36.00
Cast Iron Borings	35.00-36.00
Low Phos.	44.00-45.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	43.00-44.00

MANSFIELD

No. 1 Heavy Melt. Steel	$40.00
Machine Shop Turnings	35.00
Short Shovel Turnings.	36.00-37.00

CINCINNATI

No. 1 Heavy Melt. Steel	$36.00
No. 2 Heavy Melt. Steel	36.00
No. 1 Busheling	36.00
No. 1 Bundles	36.00
No. 2 Bundles	36.00
Machine Shop Turnings	30.00
Mixed Borings, Turnings	29.00
Short Shovel Turnings.	32.00
Cast Iron Borings	31.00

Cast Iron Grades

No. 1 Cupola Cast	47.00
Charging Box Cast	39.00
Heavy Breakable Cast.	40.00
Stove Plate	38.00
Unstripped Motor Blocks	41.00
Brake Shoes	37.00
Clean Auto Cast	46.00
Drop Broken Cast	50.00

Railroad Scrap

No. 1 R.R. Heavy Melt	42.00
R.R. Malleable	56.00
Rails, Rerolling	45.00
Rails, Random Lengths	45.00
Rails, 18 in. and under	50.00

DETROIT

(Dealers buying prices, fob shipping point)

No. 1 Heavy Melt. Steel	$34.50-35.00
No. 1 Busheling	34.50-35.00
Nos. 1 & 2 Bundles	34.50-35.00
No. 3 Bundles	34.50-35.00
Machine Shop Turnings	28.50-29.00
Mixed Borings, Turnings	28.50-29.00
Short Shovel Turnings.	29.50-30.00
Cast Iron Borings	29.50-30.00
Punchings & Plate Scrap	39.50-40.00

Cast Iron Grades

No. 1 Cupola Cast	39.00-40.00
Heavy Breakable Cast.	33.00-34.00
Clean Auto Cast	39.00-40.00

BUFFALO

No. 1 Heavy Melt. Steel	$42.00-43.00
No. 2 Heavy Melt. Steel	42.00-43.00
No. 1 Busheling	42.00-43.00
No. 1 & 2 Bundles	42.00-43.00
Machine Shop Turnings	32.00-33.00
Mixed Borings, Turnings	32.00-33.00
Cast Iron Borings	32.00-33.00
Short Shovel Turnings.	34.00-35.00
Low phos.	44.00-45.00
Elec. Furnace Bundles.	40.00-41.00

Cast Iron Grades

No. 1 Cupola Cast	40.00-42.00
Heavy Breakable Cast.	38.00-40.00
Malleable	50.00-52.00
No. 1 Wheels	38.00-40.00

Railroad Scrap

Rails, 2 ft and under	45.00-47.00
Railroad Specialties	45.00-46.00

PHILADELPHIA

No. 1 Heavy Melt. Steel	$37.00-37.50
No. 2 Heavy Melt. Steel	37.00-37.50
No. 1 Busheling	37.00-37.50
No. 1 Bundles	37.00-37.50
No. 2 Bundles	37.00-37.50
No. 3 Bundles	35.00-35.50
Machine Shop Turnings	28.50-29.50
Mixed Borings, Turnings	28.50-29.50
Short Shovel Turnings.	29.50-30.00
Bar Crops and Plate	43.00-44.00
Punchings & Plate Scrap	43.00-44.00
Cut Structurals	41.00-42.00
Elec. Furnace Bundles.	40.50-41.00
Heavy Turnings	39.00-40.00
No. 1 Chemical Borings	34.50-35.50

Cast Iron Grades

No. 1 Cupola Cast	48.00-49.00
Charging Box Cast	45.50-46.50
Heavy Breakable Cast.	45.50-46.50
Unstripped Motor Blocks	40.50-41.00
Malleable	58.00-60.00
Clean Auto Cast	48.00-49.00
No. 1 Wheels	46.50-47.50

NEW YORK

(Dealers buying prices, fob shipping point)

No. 1 Heavy Melt. Steel	$33.00
No. 2 Heavy Melt. Steel	33.00
No. 1 Busheling	33.00
Nos. 1 & 2 Bundles	33.00
No. 3 Bundles	31.00
Machine Shop Turnings	25.00-25.50
Mixed Borings, Turnings	25.00-25.50
Short Shovel Turnings.	27.00-27.50
Punchings & Plate Scrap	35.50-36.00
Cut Structurals	35.50-36.00
Elec. Furnace Bundles.	34.00
No. 1 Chemical Borings	24.50-25.00

Cast Iron Grades

No. 1 Cupola Cast	40.00-40.50
Charging Box Cast	40.00-40.50
Heavy Breakable	40.00-40.50
Unstripped Motor Blocks	35.00-36.00
Malleable	52.00-54.00

BOSTON

(Fob shipping point)

No. 1 Heavy Melt. Steel	$35.00-36.00
No. 2 Heavy Melt. Steel	35.00-36.00
Nos. 1 & 2 Bundles	35.00-36.00
No. 1 Busheling	35.00-36.00
Machine Shop Turnings	26.00-27.00
Mixed Borings, Turnings	25.00-26.00
Short Shovel Turnings.	27.00-28.00
Bar Crops and Plate	37.00-38.00
Punchings & Plate Scrap	36.50-37.00
Chemical Borings	26.00-27.00

Cast Iron Grades

No. 1 Cupola Cast	42.00-44.00
Charging Box Cast	38.00
Heavy Breakable Cast.	38.00-39.00
Stove Plate	36.00-37.00
Unstripped Motor Blocks	32.00-34.00
Clean Auto Cast	40.00-42.00

CHICAGO

No. 1 Heavy Melt. Steel	$38.50-39.00
No. 2 Heavy Melt. Steel	38.50-39.00
No. 1 & 2 Bundles	38.50-39.00
No. 3 Bundles	36.50-37.00
Machine Shop Turnings	33.50-34.00
Mixed Borings, Turnings	33.50-34.00
Short Shovel Turnings.	35.50-36.00
Cast Iron Borings	34.50-35.00
Bar Crops and Plate	41.00-41.50
Cast Steel	41.00-41.50
Punchings	41.00-41.50
Elec. Furnace Bundles.	39.50-40.00
Heavy Turnings	38.00-38.50
Cut Structurals	41.50-42.00

Cast Iron Grades

No. 1 Cupola Cast	42.00-45.00
Malleable	42.00-45.00
Clean Auto Cast	42.00-45.00
No. 1 Wheels	42.00-45.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	40.00-40.50
Rails, Rerolling	46.00-46.50
Rails, Random Lengths	41.50-42.00
Rails, 3 ft. and under.	44.00-44.50
Rails, 18 in. and under	44.50-45.00
Railroad Specialties	43.00-43.50
Angles, Splice Bars	43.00-43.50

ST. LOUIS

No. 1 Heavy Melt. Steel	$40.00-41.00
No. 2 Heavy Melt. Steel	39.00-40.00
Machine Shop Turnings	32.00-33.00
Short Shovel Turnings.	34.00-35.00

Cast Iron Grades
(Fob shipping point)

No. 1 Cupola Cast	43.00-44.00
Charging Box Cast	37.00-38.00
Heavy Breakable Cast.	35.00-36.00
Brake Shoes	38.00-39.00
Clean Auto Cast	43.00-44.00
Burnt Cast	35.00-37.00

Railroad Scrap

R.R. Malleable	54.00-55.00
Rails, Rerolling	47.00-50.00
Rails, Random Lengths	42.00-43.00
Rails, 3 ft and under	43.00-45.00
Uncut Tires	43.50-44.50
Angles, Splice Bars	43.00-44.00

BIRMINGHAM

No. 1 Heavy Melt. Steel	$36.00
No. 2 Heavy Melt Steel	36.00
No. 1 Busheling	36.00
Nos. 1 & 2 Bundles	36.00
No. 3 Bundles	31.00
Long Turnings	24.50
Short Shovel Turnings.	26.00-27.00
Cast Iron Borings	25.00
Bar Crops and Plate	38.50
Cut Structurals	38.50

Cast Iron Grades

No. 1 Cupola Cast	41.00
Stove Plate	39.00
No. 1 Wheels	36.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	37.00
R.R. Malleable	42.50
Axles, Steel	39.00
Rails, Rerolling	41.00
Rails, Random Length.	39.00
Rails, 3 ft and under	41.00
Angles and Splice Bars.	41.00

SAN FRANCISCO

No. 1 Heavy Melt. Steel	*$22.00
No. 2 Heavy Melt. Steel	*22.00
No. 1 Busheling	*22.00
Nos. 1 & 2 Bundles	*22.00
No. 3 Bundles	*17.00
Machine Shop Turnings	*12.50
Bar Crops and Plate	22.00
Cast Steel	22.00
Alloy Free Turnings	12.50
Cut Structurals	22.00
Tin Can Bundles	17.00

Railroad Scrap

Axles	29.00
Rails, Random Lengths	23.50
Uncut Tires	30.50

*Fob California shipping point.

SEATTLE

No. 1 Heavy Melt. Steel	$22.00
No. 2 Heavy Melt. Steel	22.00
No. 1 Busheling	22.00
Nos. 1 & 2 Bundles	22.00
No. 3 Bundles	20.00
Machine Shop Turnings	13.50
Mixed Borings, Turnings	13.50
Punchings & Plate Scrap	23.50
Cut Structurals	23.50

Cast Iron Grades

No. 1 Cupola Cast	27.50
Charging Box Cast	22.50
Heavy Breakable Cast.	21.50
Stove Plate	23.00
Unstripped Motor Blocks	21.50
Malleable	27.50
Brake Shoes	27.50
Clean Auto Cast	27.50
No. 1 Wheels	24.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	20.00
Railroad Malleable	27.50
Rails, Random Lengths	20.00
Angles and Splice Bars	21.50

LOS ANGELES

No. 1 Heavy Melt. Steel	$19.50
No. 2 Heavy Melt. Steel	19.50
Nos. 1 & 2 Bundles	19.50
Machine Shop Turnings	14.00
Mixed Borings, Turnings	14.50
Punchings & Plate Scrap	27.50
Elec. Furnace Bundles.	27.00

Cast Iron Grades

No. 1 Cupola Cast	30.00

We've made the "ROUNDS" for 60 years

Perhaps OUR experience can help YOU!

Yes, for more than a half century, Gisholt has specialized in the field of round and partly round parts . . . building equipment to produce them . . . helping others to use it most efficiently.

Gisholt engineers concentrate on these machine shop problems, visiting hundreds of plants each year to help solve hundreds of problems. They will gladly help you.

If you have operations in your plant which you think might be improved, we invite you to make use of this experience through the Gisholt Round Table—a clearing house for practical ideas.

Now, and in the years ahead, more emphasis than ever will be placed upon better methods, increased efficiency and lower costs. Be sure you have the best methods and equipment. It pays to "Look ahead—keep ahead—with Gisholt."

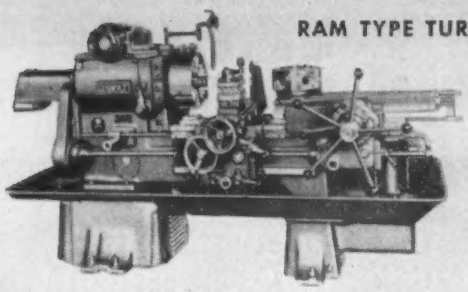
GISHOLT MACHINE COMPANY
Madison 3, Wisconsin

The GISHOLT ROUND TABLE

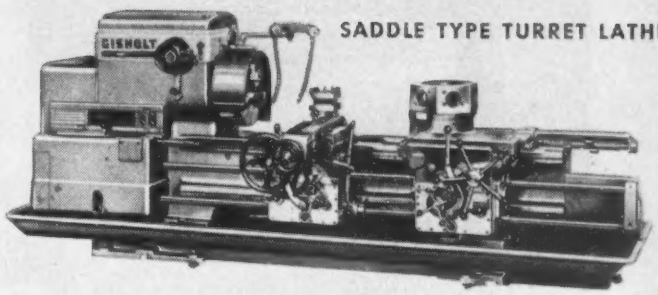
represents the collective experience of specialists in the machining, surface-finishing and balancing of round and partly round parts. Your problems are welcomed here.

See the various types of Gisholt machines in operation at the Machine Tool Show.

1947 MACHINE TOOL SHOW CHICAGO SEPT 17-26



RAM TYPE TURRET LATHES



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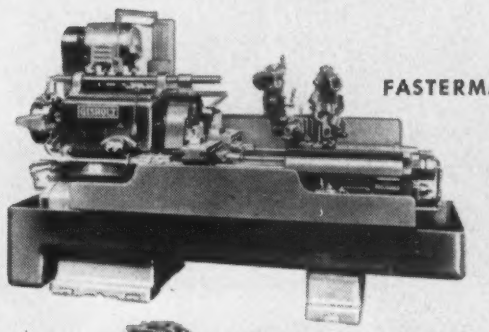

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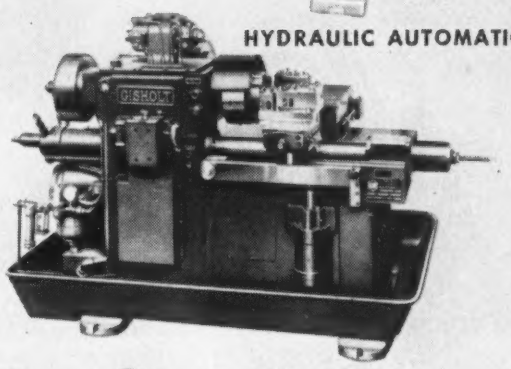

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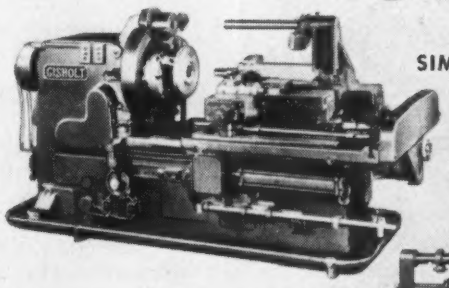

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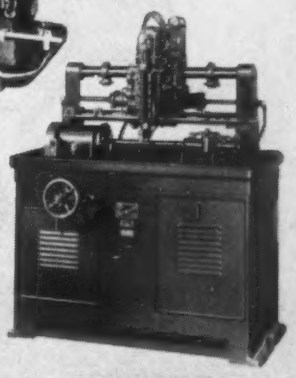
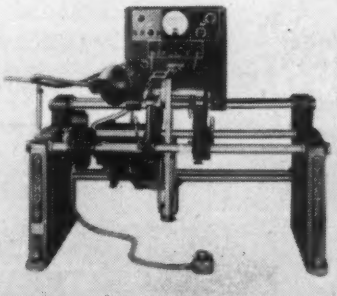


SUPERFINISHERS



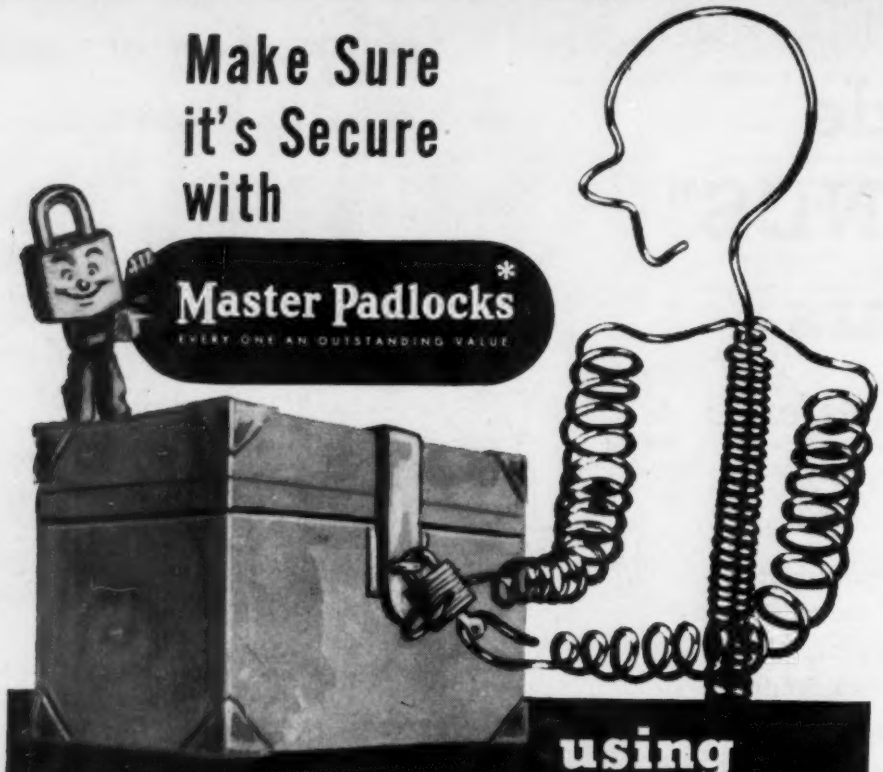
BALANCERS

TURRET LATHES • AUTOMATIC LATHES • SUPERFINISHERS • BALANCERS • SPECIAL MACHINES

Make Sure it's Secure with

Master Padlocks*

EVERY ONE AN OUTSTANDING VALUE



using

KEYSTONE WIRE

Master's famed No. 5 lock — the biggest and huskiest of them all!

A padlock can be no stronger than its case, no safer than its locking mechanism . . . and Master padlocks score on both counts.

The Master case is constructed of strong steel plates, laminated together under pressures up to 300,000 pounds, and securely riveted. The inner-workings are equally well made. Husky levers, precision-built brass cylinders, "taper round" nickel silver pin tumblers and a whole series of built-in security devices are all additional reasons why lock experts specify Master padlocks.

We are proud that Keystone wire of special analysis finds its way into important parts of these high-quality padlocks. Whatever the wire need, Keystone can normally supply it.

* *Master Lock Company, Milwaukee, Wis.*

KEYSTONE MUSIC SPRING WIRE

KEYSTONE STEEL & WIRE CO. PEORIA, ILLINOIS

SPECIAL ANALYSIS WIRE for all industrial purposes

KEYSTONE STEEL & WIRE COMPANY
PEORIA 7, ILLINOIS

Sheets, Strip . . .

Sheet Prices, Page 144

Some producers expected to cut fourth quarter allotments because of carryovers

New York — Although the flow of sheets over the fourth quarter may actually be heavier than in the current period, some leading producers will not allocate as much new tonnage as they did for the current quarter. Their carryover will be somewhat heavier in some cases and, moreover, a stronger effort will be made to bring their orders in balance, because of the approaching year end. Some sellers declare that their carryover at the end of the third quarter will amount to a month to six weeks production, as against slightly less than that on July 1.

Meanwhile, there is little easing in demand as compared with a few weeks ago, notwithstanding higher prices. Pressure, on the other hand, is not as great as it was six months or a year ago, for the reason that many consuming manufacturers have revised their postwar programs because of inability to obtain a balanced supply of steel and other manufacturing components.

Cold-rolled sheets and galvanized sheets continue in most pressing demand of all the various grades; however, enameling stock and certain types of electrical sheets are not far behind in this respect. Stainless steel supply remains easy, with deliveries available in four to five weeks.

New York — Some narrow cold strip sellers still have made no price revisions in line with action taken by certain of the leading interests. However, their new price lists should be available within a week to ten days. Demand is a bit spotty, with most sellers still having tonnage available for delivery before the end of the year.

Boston — Mounting costs are discouraging the use of higher priced substitutes for hot-rolled carbon flat-rolled products. Allocations of the latter are barely sufficient to maintain current operating schedules at metalworking shops. In numerous instances, these schedules are below projected production planned earlier in the postwar period. Considerable low-carbon high-tensile alloy stock has been substituted for hot-rolled carbon sheets, but the extra cost is limiting the volume.

Electro-coated sheets are frequently utilized in place of hot-dipped galvanized, including reflectors for fluorescent lighting fixtures. Some producers have reduced allocations of carbon sheets for the fourth quarter. The shortage includes heavier gages for 275-gallon household fuel tanks and automotive heavy stampings.

A dual price on low-carbon cold-rolled narrow strip prevails on the Worcester, Mass., base; two mills quote 4.10c and another 3.75c.

Pittsburgh — Consumers continue to press for shipments and there appears little sign of any recession in demand as a result of the recent sharp markup in prices. Actually, expectations are that demand will exceed supply well into next year with consumers scrambling all over the map for every pound of material they can pick up. This is reflected in the continued activity in the so-called "gray" market where prices double, and in some cases triple, those charged by the mills are freely paid by

buyers facing plant shutdowns for lack of steel.

Interest last week largely centered in the revisions in certain extras effected on the flat-rolled products by Carnegie-Illinois Steel Corp. These involved certain changes in chemical requirement, silicon and packaging extras. The galvanized sheet card revisions incorporate charges for certain gages and sizes which formerly were omitted.

Chicago—Recent shutdowns in the automobile industry testify to the short inventories of sheets and strip. Producers state that pressure from car builders is unrelentless, but with rolling mills running at capacity of ingot steel allocated to them, no expansion in output is possible. Available conversion capacity is also booked for the balance of the year, and beyond this mills are unwilling to make commitments. Confusion exists over nonuniform prices in sheets and strip, but independents which have posted higher schedules report scattered and mild protests from consumers.

Cincinnati — Pressure for sheet steel is as insistent as ever, following the recent price increase, with no cancellations or cutbacks. Fourth quarter rolling schedules are shaping up, and tentative allotments indicate little change in district quotas from recent periods. Allocations for freight cars will likely be sustained. Housing needs have not been definitely set for the fourth quarter, and there might be some shrinkage there.

St. Louis — Sheet production continues to improve, with Granite City Steel's labor troubles abated. With productivity increasing and pipelines nearly filled following the last labor delays, capacity production now is impeded only by inadequate pig iron quotas and poor quality scrap. New orders have been consistently rejected the first of the year and the company consequently is gaining ground on backlogs. Backlogged 1945 orders are being rolled this month and there is likelihood carryovers from 1946 and the remainder of 1947 orders will be cleaned up by the end of this year. The company hopes to open 1948 books by Oct. 15, when tonnage will be apportioned customers on the basis of past purchases and present emergency needs. Whether it gets abreast of orders by the first quarter depends somewhat on whether the government requests new priorities on housing and railway car steel. The company currently is operating seven open hearth furnaces. Rolling capacity is to be increased in the fourth quarter by completion of a new cold rolling mill.

Birmingham — No effect on demand is noted as a result of recent price increases announced here. Producers, as usual, are unable to meet requirements as consumers continue to press for delivery. As indicated before, little relief of a permanent nature is expected in sheets in this district before mid-1948 at the earliest. New cold-rolling facilities under construction here are counted upon to help the situation measurably.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 144

Chicago—Most suppliers of reinforcing steel state they are over-committed, and consequently are shying away from new business. Fortunately, current inquiry has slackened off some, but could pick up at any moment. So long as overall steel demand remains at its present level, there is little hope of mills, either billet or rerolled rail, being able to increase production of reinforcing items.

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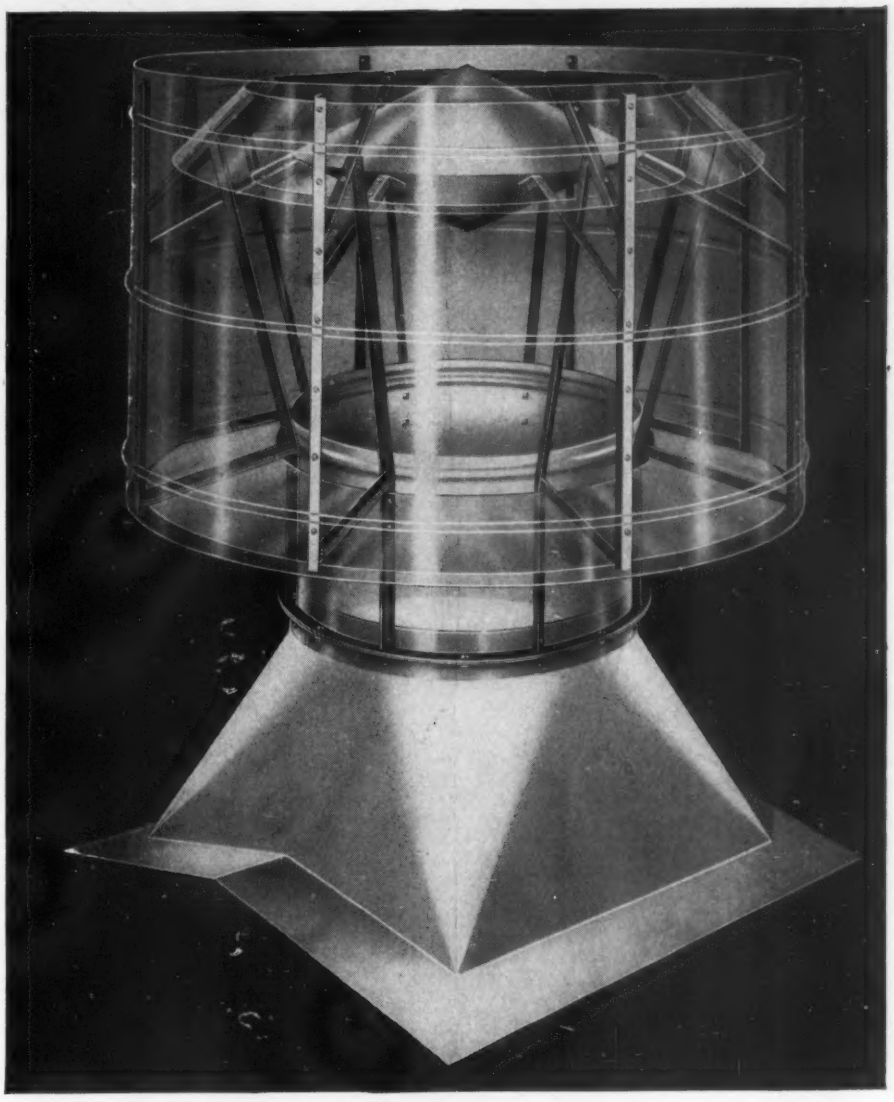

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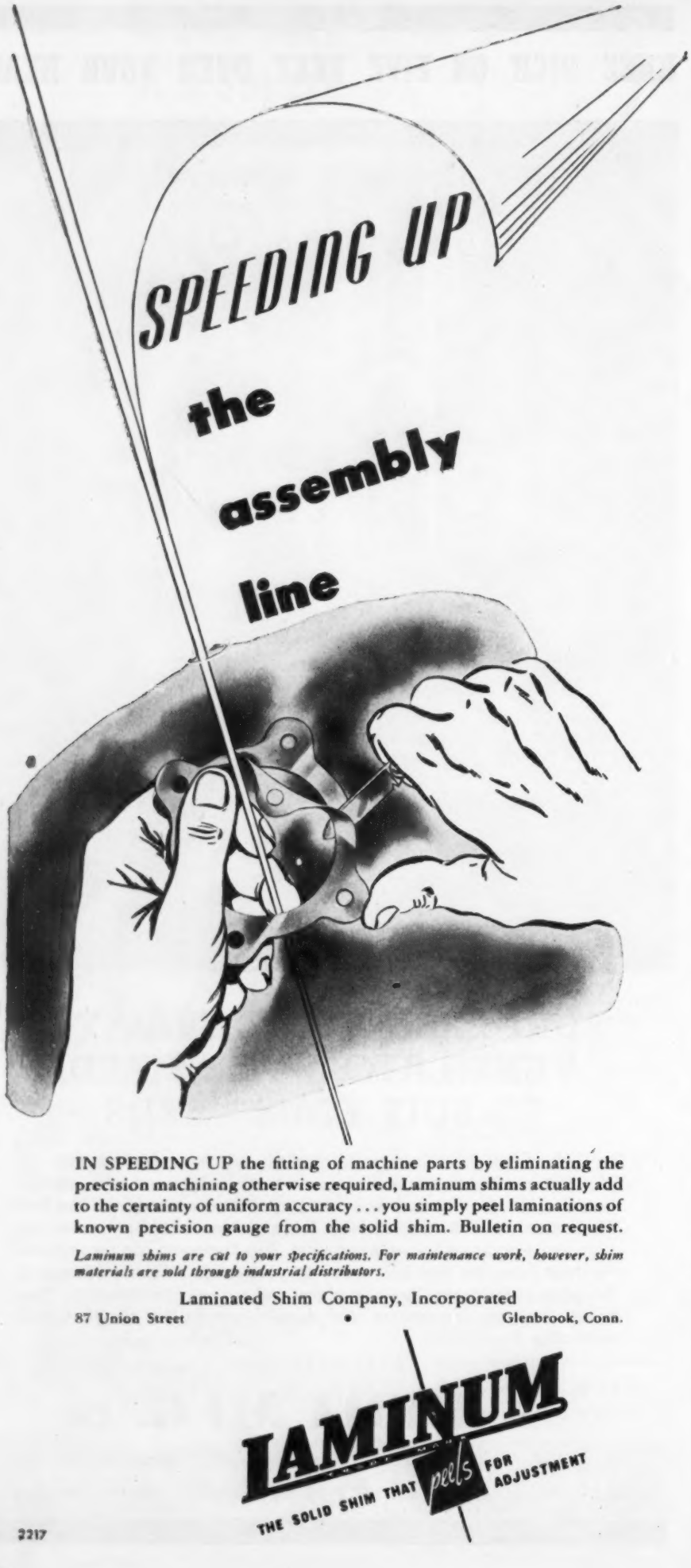

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Steel Bars . . .

Bar Prices, Page 144

New York — Little easing is noted in the hot carbon bar supply. Only in few cases are quotas for the final quarter any freer than at present and in the small sizes there is no improvement whatsoever. Cold drawn carbon bars, however, continue in easier supply with sellers not only having more tonnage to offer for shipment over the remainder of the year but showing an increasing disposition to book tonnage for shipment beyond. Alloy bar deliveries remain around four to five weeks, with supply well in excess of demand.

Boston — Carbon bar supply has eased further, notably in cold-finished down to a smaller range of sizes. One Ohio producer has entered the New England market with cold-drawn bars, supplementing supply and other producers now are seeking business for one-inch and larger size bars. Hot-rolled carbon stock also is freer, reflecting in part the earlier withdrawal of an eastern producer from the midwest, making available more steel for the western seaboard. Most bar users, with few exceptions including one forge shop, are taking full quotas of hot-rolled. On the whole, buying is more realistic; where formerly users took in all tonnage available, whether needed or not, most of them now gear new commitments to inventory and current production levels. More mills are now selling on a Buffalo base only on finished stock rolled at that point, reverting to the policy of selling on the producing mill basis on other sizes and grades.

Philadelphia—While hot-rolled carbon bars are not under as much pressure as are the flat rolled products, there has been no appreciable easing in pressure for shipments, except in the larger sizes. In general, quotas for the fourth quarter are little, if any, larger than for the present period. Supply of cold-drawn bars continues to ease, however, and alloy bars can be had for early shipment. Sooner or later this situation in cold bars should affect the hot-rolled carbon bar supply more noticeably.

Chicago—Chief bottleneck in bars is the smaller sizes of carbon grades, producers being unable to supply ample tonnages to satisfy consumers. Larger sizes are under less strain, and alloys are available freely. The farm implement and machinery industries are running at a high rate and find their inventories of bars handicapping them in the maintenance of production schedules.

Seattle — While reinforcing bar mills have taken no large contracts, a sizable volume involving many small jobs, 20 to 50 tons each, is reported. Higher prices have not curtailed demand for reinforcing bars, although the British Columbia market is off slightly due to exchange. Northwest Steel Rolling Mills is attempting to make up lost time due to annual overhaul.

Backlogs remain fairly stationary. Little interest is shown by mills in forward business, more attention being given to complete current contracts. Several large tonnages will be up for placement soon for buildings at the University of Washington.

Washington state will call bids in September for the senile ward, Eastern hospital. Unstated tonnages of reinforcing are involved in two schedules for the Minidoka project, for the Fibreboard plant, Portland, Oreg., and the Portland warehouse and pier for the Port of Portland. Reinforcing also will be required

for several concrete bridges in Oregon. Bethlehem Pacific Steel Co., Seattle, has taken 380 tons for the Buckley state hospital, Buckley, Wash.

Plates . . .

Plate Prices, Page 145

New York — While stringency continues in plates, some of the leading tank fabricators claim that shortage of steel is no longer the principal bottleneck with them, excepting on such jobs as require gages ¼-inch and under. They feel that generally speaking they are over the hump insofar as steel supplies are concerned. Their main problems at present have to do with erection. They are finding it difficult to get men sufficiently skilled to handle the work now being fabricated.

Most tank fabricators have been able to step up their shop operations to some extent, but even at the present rate some of them have sufficient work on hand to keep them engaged for a full 12 months. New demand is being adversely affected by the continued increase in costs, especially public work, for which definite appropriations have been made and which more often than not fall short of actual costs once they are estimated by contractors. Some of these projects have been withdrawn indefinitely, while others have been set back for a time, pending approval of greater appropriations.

Rising costs have not affected private work to such an extent. However, despite the influence of higher costs, demand is still quite active, and were deliveries at most tank shops not so extended, more work would be placed than is actually the case.

Most plate producers have little new tonnage available for delivery over the remainder of the year and with few exceptions are not committing themselves for shipments beyond.

Boston — Most plate producers will carry over a large volume of unfilled orders into the fourth quarter, thereby limiting the tonnage for allocation in that period. This is especially true in the case of most mills for welding quality tank plates. Other mills have been limiting acceptance of light tank steel as an unprofitable item, but have loaded up with extra-carrying tonnage. Demand is considerably in excess of supply; although in balance with most weldment shops. Floor plate buying holds at a surprisingly high level with deliveries normal. Small pressed heads, 60 inches and under, range from five to ten weeks but spun heads over 60 inches are spread from 14 weeks up to the end of this year.

Philadelphia — Plate producers are still turning down considerable tonnage. Some are out of the market entirely for this year and are taking nothing for shipment beyond; others, while taking some tonnage for both this year and early next, are nevertheless turning down such business as a result of their policy of selecting only the more attractive tonnages required in rounding out their schedules. Further, while taking some business for next year, they are still cautious about extending their schedules too far.

Pittsburgh — Tight situation in plate market is unrelieved. Here and there buyers appear to be displaying a little more caution but this has not resulted in any noticeable easing of specifications. Higher price has not discouraged ordering to any extent. Producers rolling plates on strip mills are in an unusually

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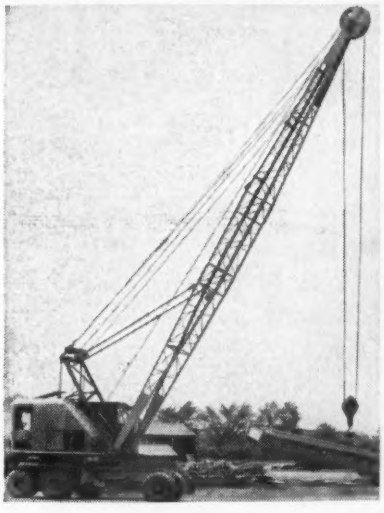

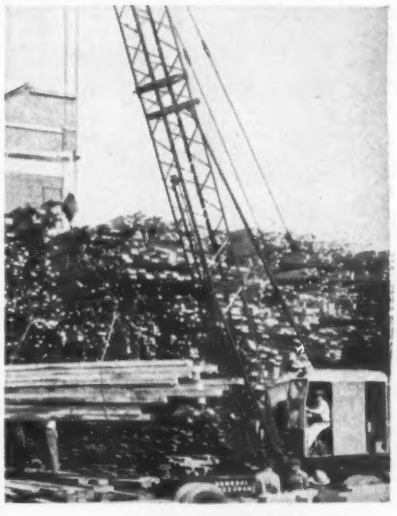

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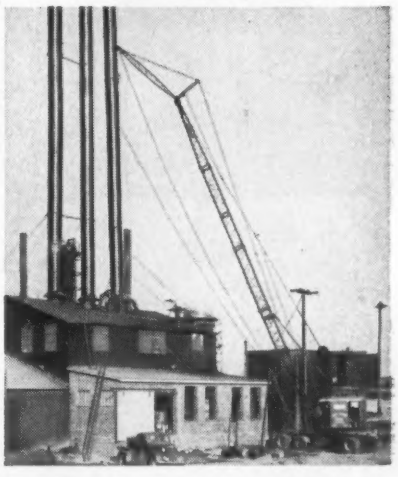

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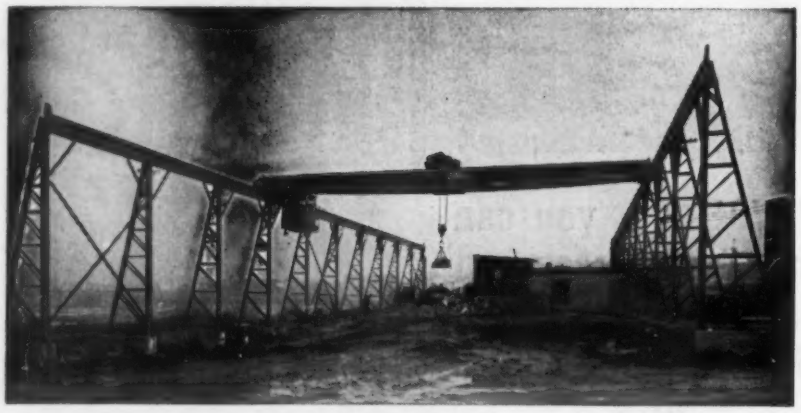

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tight position. Production is being allotted to consumers on the basis of historic position with the mills prewar and indications are allotments for last quarter will be about the same as during the present market.

Birmingham — Demand for plates continues high in this territory. Carbuilding at Bessemer is taking a large tonnage. An assortment of relatively small jobs also is contributing substantially to the plate demand in this district.

Seattle — Small tonnages predominate in the plate fabrication industry inventories being short and deliveries of materials slow. Tank and boiler work is keeping plants close to capacity. No large jobs are immediately pending.

An unstated tonnage is involved in a siphon contract for the Minidoka, Idaho, reclamation project, bids Sept. 8 at Burley, Idaho.

Structural Shapes . . .

Structural Shape Prices, Page 145

New York — Public work dominates structural inquiry at present. Several new schools are up for figuring; municipal housing and bridge construction involve some sizable tonnages.

The Franklin Contracting Co., Newark, N. J., was awarded on the general contract for building a 3150-ton state viaduct in northern New Jersey (route 25, section 34) over the Pennsylvania and Lehigh Valley tracks.

Most fabricators are well booked for the remainder of the year and some, including the very largest, are booked substantially into next year. As a result, most fabricators are in position to be selective in their acceptance of tonnage. Plain material supply also is tight.

Boston — Most of the larger fabricating shops are scheduled into February, but smaller district fabricators can make delivery late this year. Bulk of inquiry, which is light, now coming out is for early delivery and contracts are frequently placed on a delivery basis. While some spot openings recently developed in the East, structural mills generally are scheduled for the balance of this year, and fabricators are limited in the volume booked by mill quotas. Currently telephone buildings are taking a good volume.

Philadelphia—Activity in this district's structural shape market continues spotty with an award of 815 tons for a state bridge at Wilkes-Barre, Pa., outstanding. This contract went to American Bridge Co., Pittsburgh.

Chicago—Structural steel fabricators are displaying little interest in new projects as they come out for bidding. Most shops have heavy bookings extending into 1948 and as long as steel promised by mills must conform to assigned quotas, there is little promise that fabricating activities can be expanded over present level. Greatest tightness is in shapes in the medium and smaller sizes.

Birmingham — Shape demand, on the whole, assumed nothing of a phenomenal nature due to reported unsettled condition in building, especially as regards costs. Plans are being formulated for major projects. But thus far, except for some apartment house building using relatively little steel, they seem highly indefinite as to a starting date.

Seattle — No large projects involving shapes are up for immediate action. The largest job pending is the Narrows bridge, bids deferred until insurance problems are solved. While there is a good demand for small tonnages for industrial

and public works construction, plants report inquiries less numerous, due to seasonal influences and higher prices. It is difficult to obtain material for large jobs while plants can more readily cover their needs with Coast mills for smaller projects. Allocations of eastern mills are far below requirements of this area.

Isaacson Iron Works, Seattle, has contracted 400 tons for a telephone exchange addition, Seattle, and 100 tons for a similar project at Olympia, Wash. John Deere-Lindeman Co. is building a $50,800 forge plant at Yakima, Wash, 74 x 181 feet, steel construction, replacing a building destroyed by fire.

Washington state plans a 240-foot steel and concrete bridge over the Stillaguimish river, army engineer hearing at Stanwood Aug. 27; also a fixed cantilever span, 240 feet between piers, near Longwood, army engineer hearing Aug. 29.

Wire . . .

Wire Prices, Page 145

Chicago—Demand for merchant wire products continues exceedingly strong. Items on which consumers are exerting extremely heavy pressure for deliveries as well as increased quotas include building type nails, bale ties, barbed wire, heavy-gage field fence and steel posts. In this immediate area, 8, 10, 12, 16 and 20-penny nails are exceedingly scarce. It is reported that in the past few weeks several purchasing agents for foreign companies have shown interest in the prospect of getting delivery on as many as a half million kegs of nails.

New York — Wire manufacturers report a little dropping off in orders, particularly in some of the specialty lines. However, all appear to be well booked for the remainder of the year. Most wire sellers have not yet completely revised their schedules and in at least one or two instances no changes have been made whatsoever, pending further study of costs.

Birmingham — Most wire consumers, as usual, are asking for total tonnages beyond that allocated to them as mills seek to spread supplies as far as possible. Manufacturers' wire, baling wire, nails and assorted farm fencing are all reported as being extremely short.

Republic Steel Revises Pig Iron Pricing Policy

Will maintain basic iron produced at Cleveland and Buffalo at scrap levels

Cleveland — Republic Steel Corp. inaugurated a new pricing policy last week, covering pig iron produced at its Buffalo and Cleveland furnaces. Effective as of Aug. 13, basic pig iron prices at those two basing points will be raised to the heavy melting steel scrap price level when the latter exceeds the pig iron prices.

The price of basic iron will be established each week at the published quotation for heavy melting scrap quoted for the preceding week in the respective districts. While no ceiling is erected over the price schedule, on a downturn in scrap its pig iron price at those two points will drop only to the level of the currently quoted pig iron market. Usual differentials and extras will be maintained.

This policy is a refinement of one which was adopted some weeks ago by a leading eastern producer who tied the price of iron loosely to that of scrap. Republic is the first major producer to formulate a plan to counteract the high scrap market. It was pointed out by officials of the company that the move was made so that they no longer would be forced to replace pig iron tonnages sold at comparatively low levels with scrap purchased on the open market at high prices for use in their own operations. The alternative would have been to withdraw from the merchant iron market at those two points.

Pig Iron . . .

Republic Steel advances prices $3 a ton in the Birmingham district

Pig Iron Prices, Page 146

Birmingham—Republic Steel Corp. advanced pig iron prices $3 a ton, effective Aug. 13, to the basis of $36.38 for No. 2 foundry and $35.88 for basic. This restores the price situation which existed under the Office of Price Administration which granted Republic a premium over the general market in that district. Other producers in the district held prices unchanged last week.

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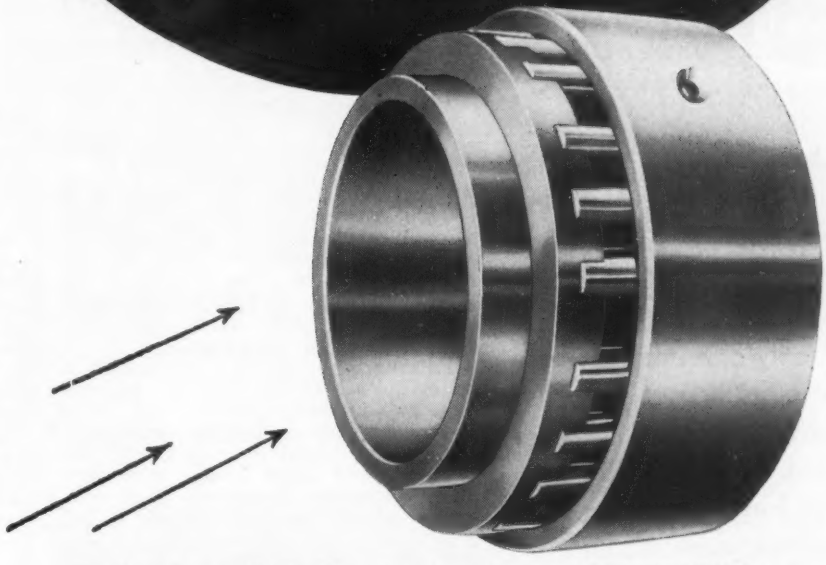

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The government-owned and Republic-operated blast furnace as Gadsden, Ala., is idle because of having broken down and requiring extensive repairs. Output of this furnace had been channeled to the trade, principally under the federal housing program. The district is suffering severely because of the iron shortage which now will likely become even more critical.

Demand for pig iron by melters here is greater than ever before in the history of this district. Merchant iron melters say demand even exceeds war years, due partly, at least, to the fact that scrap, in some categories, tops iron in cost by several dollars a ton. No early relief in pig iron supplies is anticipated in the district.

New York—Although there is a scarcity in pig iron and scrap, most foundries in this district will likely melt more iron than in July, when vacations caused extensive interference with schedules. Operations this month would be still higher if raw materials, including coke as well as pig iron and scrap, were in freer supply. Most foundries have not the backlogs they had early in the year; nevertheless, they still have far more work than they can handle under present conditions.

Boston — While some gray iron foundries are less active, they are taking in all pig iron available. Malleable shop backlogs are heavier than for most gray iron shops and demand for that grade is notably heavy. The district furnace is slightly lengthening its malleable run this month. The high scrap price level is not only influencing demand for pig iron, but is also affecting furnace production costs involving borings and turnings for higher production output.

Buffalo — Blowing in of the second Republic blast furnace, which had been out of service about two months for relining, boosted the district pig iron rate to 94 per cent last week. Return of this unit should provide some additional merchant iron in the coming months as the stack usually produces foundry grade in the course of rotation.

District operators show concern over ore stockpiles with an eye to the winter. There has been a lack of bottoms so far to overcome the deficit created by the late opening here of navigation on the lakes this year. Foundries continued to complain of poor quality and inadequate supplies of oven coke.

Pittsburgh — Pig iron production is being pushed to the limit of available capacity with consuming demand far in excess of producers' ability to supply. Little, if any, relief is in sight with the high price of scrap forcing steel producers to use an increasingly large proportion of pig iron in their steel melts. Blast furnace scrap is quoted as high as $39, which appears ridiculous and completely out of line with normal since foundry pig iron here is selling for around $37. As a result of the tighter supply situation traceable directly to the scrap run-away, the increased diversion of hot metal to the steel furnaces is at the expense of the merchant trade.

The market for pig iron is firmly established at the higher level of prices recently effected. Last week the Carnegie-Illinois Steel Corp. followed the lead of the eastern producer and marked up spiegeleisen $3 per ton, effective Aug. 11.

Chicago—Foundries are still forced to gear their melting operations to the tonnage of pig iron they are able to obtain. Producers and suppliers are pressed constantly to speed shipments and increase quantities. Tightness and high price of steelmaking scrap forces steel producers to rely more heavily on basic hot metal from blast furnaces, a situation which makes less pig iron available to foundries. Of the district's 42 blast furnaces, 39 are now in production. On Aug. 10 Carnegie-Illinois Steel Corp. relighted its No. 5 stack at Gary after being down since July 1 for relining. Two furnaces of this company are under reconstruction and No. 3 Indiana Harbor stack of Inland Steel Co. is down for repairs.

Cincinnati—Melters are pressing for pig iron, with little apparent hope for expanded allotments. Shipments have improved, but not at a rate which makes for restoration of tonnage lost in July during furnace curtailments. The district melt still carries a large proportion of scrap, despite the price, because pig iron quotas are inadequate.

St. Louis — Pig production in this district continues at its 1000-ton daily capacity. A 10-day supply of coke prevented an anticipated curtailment during a coal mining holiday in the West Frankfort, Ill., fields. Coal shipments to the Koppers furnaces from that source stopped for four days. Iron deliveries are on schedule. Scrap prices are putting noticeable new pressure on pig iron. Present rationing among melters appears due to continue indefinitely.

Scrap . . .

Prices break sharply with sales at $40 for heavy melting in Pittsburgh

Scrap Prices, Page 150

Pittsburgh—Sharp break in the scrap market developed here last week with at least one substantial sale of No. 1 heavy melting grade to a district mill at $40, which was $2 below the previous minimum ruling in the district. Several substantial tonnage sales were also reported last week at $42 and $42.50, but upon confirmation of the $40 sale the market developed further weakness. Toward the close of the week prices were definitely off $2 to $3 per ton with $39 to $40 the range quoted on No. 1 heavy melting. Other grades were down correspondingly.

Lower prices appear to have largely developed from the drouth of business accompanying withdrawal of the mills from the market on a large scale. The new show of weakness may bring out some buying but expectations are the mills now will hold off further, pending clarifications of the situation and possible settling of prices on a still lower basis.

There is no question that the market has lost some of its zing. While the higher prices recently quoted do not seem to have brought out much additional tonnage, at the same time buyer resistance has increased with practically all of the mills marking time on purchases.

Looking at the situation from the short-term viewpoint it would not be altogether surprising were a downward adjustment in quoted prices experienced over the next few weeks. From the long-term viewpoint, however, the market presents a bullish appearance. The scarcity of scrap has not been alleviated to any substantial extent over the summer and the supply situation very likely will become really acute during the winter when collection and preparation of ma-

terial normally are hampered by adverse weather conditions.

Cleveland—Heavy melting steel scrap prices broke sharply here last week due to the widespread resistance of mills to the previous high levels. A substantial tonnage of heavy melting sold at $38.50 a ton, delivered, compared with a top price of $43 a ton paid during the preceding week. The differential which previously was quoted for scrap taking a freight rate of $2.50 or more and for material developed within the $2.50 rate structure has been eliminated. Shipments have improved slightly in recent weeks but mills have been unable to add very much tonnage to reserves due to the high rate of consumption.

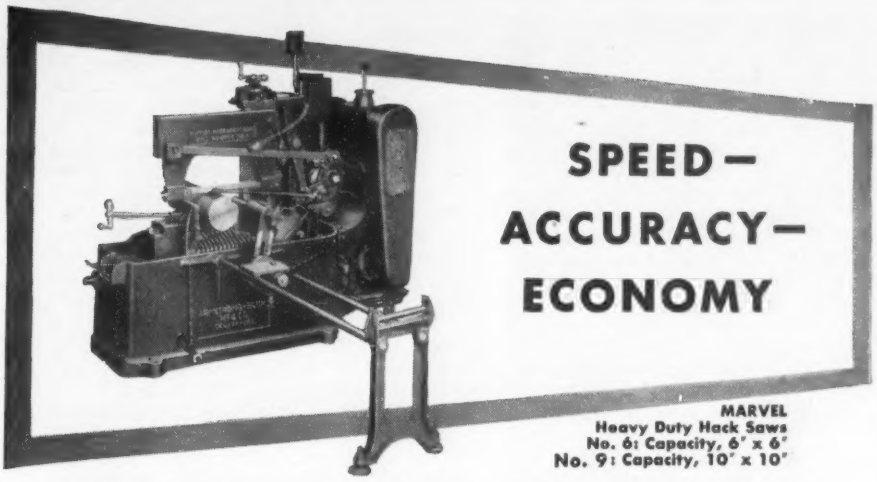
Cast steel eased to a range of $46 to $47 while cast iron grades were lower at $45 to $46 for No. 1 cupola, $43 to $44 for charging box cast, $42 to $43 for stove plate and burnt cast, and $41 to $42 for heavy breakable cast and unstripped motor blocks.

The railroad grades were lower at $39.50 for No. 1 heavy melting, $44 to $45 for rerolling and random length rails, $48 to $49 for rails 3 feet and under, $50 for railroad specialties, $49 for angles and splice bars, and $45 to $46 for uncut tires.

Youngstown—Heavy melting steel scrap declined here last week to $40 a ton, the differential for material carrying a $2.50 or more freight rate having been eliminated. Machine shop turnings were quoted $34 to $35, delivered; short shovel turnings and cast iron borings, $35 to $36; and low phos, $44 to $45.

Philadelphia — Major melting steel grades have dropped more than $3 a ton, with downward adjustments in several other grades of scrap. Some steel scrap consumers who have been out of the market recently are more active although purchases generally have not been large. With the market off, there is a disposition to see how far it will settle before covering on too large a scale. No. 1 heavy melting steel is now $37-$37.50, delivered, with No. 2 heavy melting, No. 1 busheling and Nos. 1 and 2 bundles also on the same reduced basis. No. 3 bundles is $35-$35.50; machine shop turnings and mixed borings and turnings have declined to a spread of $28.50-$29.50, delivered, short shovel turnings $29.50-$30, bar crops and plate and punchings and plate scrap $43-$44. Cut structurals are $41-$42, with electric furnace bundles unchanged at $40.50-$41. Heavy turnings are off $1 to $39-$40, and chemical borings are unchanged. While No. 1 cupola cast is unchanged at $48-$49, delivered, charging box cast and heavy breakable cast have dropped to $45.50-$46.50 and unstripped motor blocks to $40.50-$41. Malleable and clean auto cast are steady, although No. 1 wheels are down $1 to $46.50-$47.50.

New York — Brokers' buying prices have dropped $3 a ton on the principal melting steel grades, to $33 fob shipping point. Nos. 1 and 2 melting steel, No. 1 busheling and Nos. 1 and 2 bundles are now holding to this level. No. 3 bundles are $31. In view of the turn in market prices, consumers, while buying a little more freely, are still moving cautiously until they can better gage the situation. Turnings are unchanged although low phos scrap has dropped, with punchings and plate scrap now around $35.50-$36, and electric furnace bundles $34. Brokers have also revised their prices on No. 1 cupola cast, charging box cast and heavy breakable to



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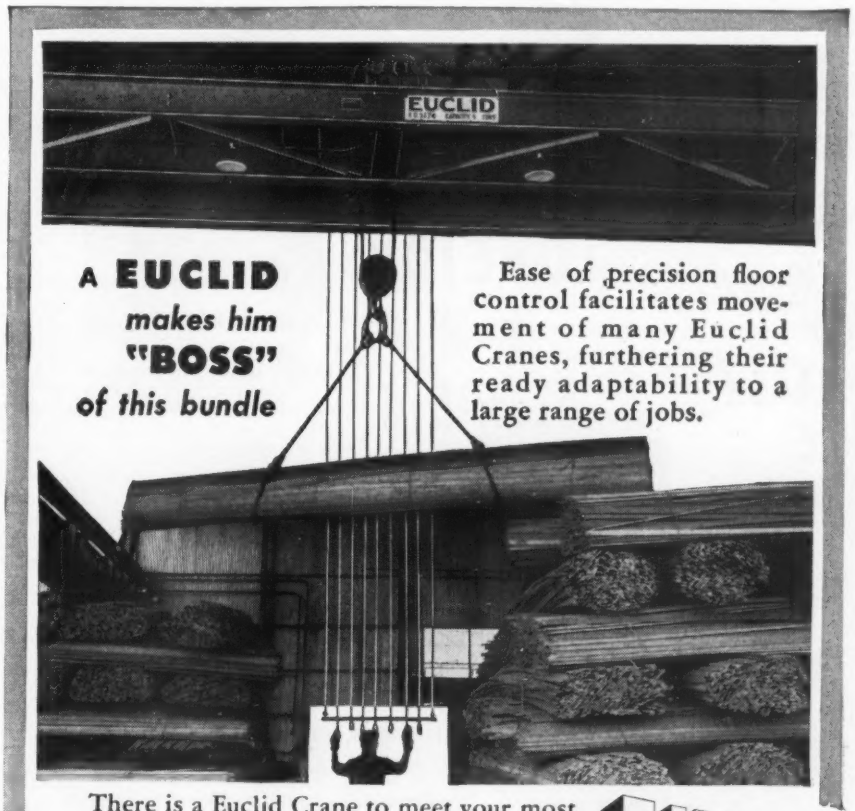

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around $40-$40.50, shipping point. Untripped motor blocks are temporarily unhanged, but malleable, which is extremely scarce, is higher at $52-$54.

Chicago — Last week scrap prices dropped $3.50 per ton from an all-time high. Open hearth grades are now selling at $39, delivered mill. The decline came in several steps rather than in one reduction. New buying is light, lending further weakness to the market. Sellers, on the other hand, are more willing to sell. Meanwhile shipments are heavy as old orders are being filled and it is believed that mill inventories are ample for the time being. The whole market is unsettled as buyers and sellers seek to determine whether prices will stabilize or drop further.

Buffalo — Scrap market developed an easier tone last week as large consumers refused to contract for additional tonnage at the $43 peak for open-hearth grades. Brokers said offerings were freer, due in large measure to the withdrawal of "outside" buyers throughout the district, and indicated that business could be done at $2 to $3 below the last reported sales. With the leading consumer of low phos out of the market, there was little pressure for this grade in evidence. Five thousand tons of steelmaking scrap arrived by boat from the lakehead and more than 3000 tons came by the Barge Canal from the seaboard.

Detroit — Followng the precipitate break of scrap prices on Aug. 6 from what steel mills apparenly decided were fantastically high levels, the market continues weak. Most old orders have been covered and there is little buying here at the moment. Mills are talking of purchases at $37 per ton, which would make dealers' buying prices on steel grades in the area of $34.50-$35, or off about $5 from the highest point reached in the flurry of the past four weeks. Automobile scrap continues to be earmarked as to destination, and tonnage has declined an average of 10 per cent due to slowdowns and closings in assembly plants and some manufacturing divisions. Instances are reported of mills turning down earmarked railroad scrap, presumably because they felt prices were too high.

Cincinnati — Steelmaking grades of scrap iron and steel have weakened in the wake of decision by mills in this area to cease buying. The melt is being supported from inventory and deliveries against old contracts. Prices lost the $2 added in the preceding week, plus another dollar. Scrap grades are not as strong as recently, but failed to incur the sharp cut. Tonnage is coming out in fair volume, some of it undoubtedly from speculative stocks.

St. Louis — Steel mills and foundries alike have withdrawn almost unanimously from the scrap market in an effort to drive prices down. On the basis of unfilled contracts and ground stocks, they are believed in position to keep the boycott in effect at least two weeks. Prices here are at an all-time record high and mill complaints of poor quality are numerous. There were virtually no sales last week. Brokers largely refused to quote prices or accept offerings in the face of the consumers' withdrawal. They fear to buy for inventory at present levels. Shipments have continued slow under adverse weather conditions, but are expected to speed up if the buyer boycott continues. Normally such fear of a price drop or contract cancellations is reflected in better shipments within a few days. The better elements of the scrap industry here regard the current "freeze-out" as a needed checkrein on the formerly chaotic market. They believe it may provide a breathing spell and sales vacuum needed to restore sanity and permit firm quotations again.

Seattle — Steel scrap receipts show some increase since the price was advanced $2 to $22 per gross ton, delivered mill. Variable prices are being paid at outports depending on the freight charges. Deliveries at local mills are equal to consumption and it is hoped inventory additions may soon be appreciable. Buyers sense a leveling off and expect that present prices will attract larger tonnages from the country. Cast iron scrap remains unchanged at $27.00.

Warehouse . . .

Warehouse Prices, Page 147

Pittsburgh — Higher price schedules effected within the past two weeks by local steel distributors do not seem to have discouraged buying to any extent at all. Demand continues as pressing as ever and with warehouse stocks unbalanced the jobbers are having a difficult time meeting their customers' requirements. For the most part, the markup in prices approximated the increase in product increases made by the mills. This resulted in a narrowing of the percentage markup over mill prices and some question is raised whether the jobbers in time will not seek to restore the former differential. At any moment, however, there does not seem to be any inclination on the part of the larger interests at least to make a move in this direction. The warehouses here have been working diligently to catch up on accumulated orders resulting from the recent 60-day tieup of truck shipments because of a strike by the truckers. Last week most sellers reported they had made good headway against the jamup and expected to be out of the woods in this respect within another week at most.

Cleveland — Further revision in prices is planned by warehouses here, following the elimination of the Cleveland base on certain products. Bar size angles, channels and tees are now quoted, for instance, on a Youngstown mill base; rounds and squares over 3½ inches on a Pittsburgh base; and hexagons over 7/8-inch on a Youngstown base. Some jobbing interests are hesitant in boosting prices to reflect this development fully and may absorb at least part of the increased freight charges.

Some mills have reduced jobbers' quotas for the fourth quarter as much as 25 per cent from those of the current period as they attempt to reduce their order backlogs. Warehouses will be forced to reduce their commitments proportionately since they have no reserve stocks in hot-rolled and galvanized sheets, shapes, plates or other tight products.

Boston — Warehouses have followed the mill price advances, but with some refinements and adjustments ahead due to dual mill quotations for some products. Slackening in demand for warehouse steel has been slight, hardly noticeable in the short supply items. Structurals and plates move directly to consumers as delivered and distributors are operating with meager inventories. Incoming volume of flat-rolled is lower and the sheet shortage curtails total sales. Cold-

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HOTEL CLEVELAND
Cleveland, Ohio

finished bar supply is better balanced than hot-rolled carbon.

Chicago—Steel warehouses report no easing in demand for steel, higher prices notwithstanding. Price appears to be of considerably lesser importance than availability. However, customers are not as readily disposed to accept size or grade substitutions as they have been in the past. Inventories are scant on most carbon grades, particularly flat rolled items, but are adequate on such products as stainless, alloys, cold finished bars and some specialties.

Cincinnati—Warehouses face a declining sales volume this month because mill replenishments fail to offset the drain last month on inventories. Stocks in some items are near depletion, yet demand is holding without letup.

Seattle — Increased prices thus far have not affected demand for jobbing goods, wholesalers reporting a steady volume of business, all out of stock goods moving freely. Sheets continue the outstanding critical item, and no improvement is in prospect.

The new price list in the Seattle-Tacoma area shows advances of 30 points in hot-rolled and 35 in cold-rolled products. HR bars from 5.00 to 5.45; CF bars from 7.10 to 7.45; shapes from 4.95 to 5.25; carbon plates from 5.15 to 5.45; floor plates from 7.25 to 7.55.

Rails, Cars . . .

Track Material Prices, Page 145

Washington — A railroad equipment buying program, calling for expenditures by India of about $60 million in the United States, England and Canada between now and 1950 was outlined last week by M. Asaf Ali, Indian ambassador to the United States. The first of 16 steam passenger locomotives ordered by India last January from Baldwin Locomotive Works, Eddystone, Pa., has been completed. He said his country will require at least 400 more passenger locomotives, to cost an estimated $40 million, while about $15 to $20 million is being earmarked for freight locomotives.

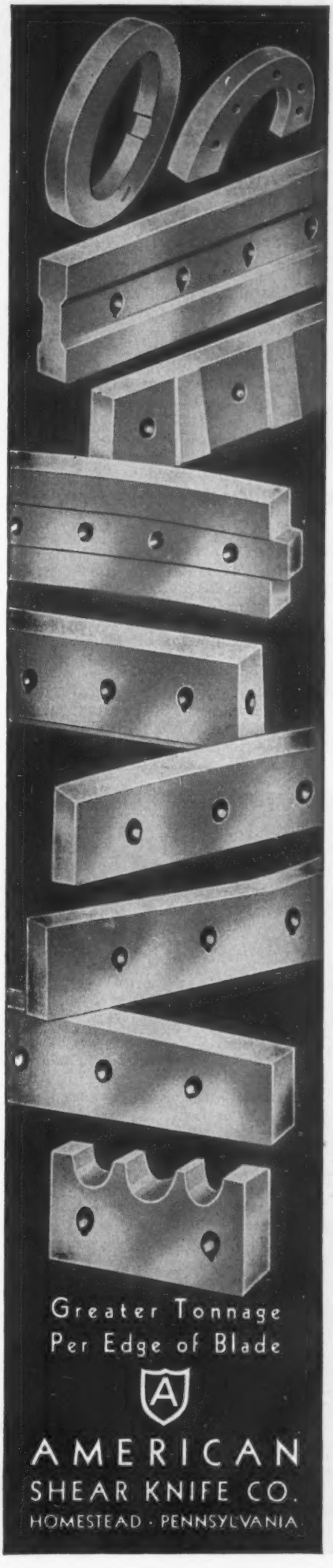
Senator Clyde M. Reed, Republican, of Kansas, said last week that unless the new car output approximates 7000 in August and 10,000 in September he will call a meeting in October of the Senate Commerce subcommittee, which he heads, and subpoena records of car builders. He said there was a difference of 160,000 tons between steel delivered to car manufacturers from March to June and that which appeared in finished products.

New York — Domestic freight car buying has taken a sharp spurt, more than 9000 cars having been reported as placed during the past week or so. Several orders, each involving 1000 cars or more, have been placed, with 2000 refrigerator cars for Armour & Co. and 1600 box cars for the Union Pacific outstanding.

The following table shows monthly awards:

	*1947	*1946	1945	1944
Jan.	†9,172	1,500	7,200	1,020
Feb.	13,727	2,403	1,750	13,240
March	12,049	4,512	2,560	6,510
April	†8,836	3,764	1,120	4,519
May	7,390	3,025	1,526	1,952
June	†13,084	3,335	670	1,150
July	14,865	14,836	3,500	795
Aug.	....	9,629	7,240	3,900
Sept.	....	12,768	12,840	400
Oct.	....	3,407	1,320	2,425
Nov.	....	6,707	1,650	1,065
Dec.	....	3,041	4,116	16,245
Total	....	38,927	45,432	53,221

* American Railway Car Institute. † Revised.



Tubular Goods . . .

Tubular Goods Prices, Page 145

Boston — Although most pipe distributors are getting full allocations, direct shipments are small and heavy demand on jobbers keeps inventories down. Much of this demand stems from dearth of direct shipments and pipe users are frequently forced to fill relatively small orders from several sources. Utilities are short of pipe and are pressing for heavier tonnage for next year. Butt weld is in the tightest category. Heating season demand has started earlier than usual and demand for two-inch and under is strong. Galvanized is not quite as tight as black pipe.

Seattle — The cast iron market is suffering seasonal inaction, but there is a large potential demand for pipe in this area. No sizable jobs are up for bids. The mill situation is slightly improved, one large agency reporting it has advanced future deliveries from 24 to 18 months.

Metallurgical Coke . . .

Coal Chemical Prices, Page 146

Washington — Total distribution of coke in 1946, as reported by producers, amounted to 58,387,297 tons, a decline of 13 per cent from 1945 and 21 per cent below the record set in 1944, according to the Bureau of Mines. At the end of the year, 10,181 beehive ovens were in operation, an increase of 1559 over January, and a total of 824 new vertical slot-type ovens with an annual coke capacity of 4,454,000 tons were under construction, mainly at steel plants where existing facilities were unable to meet requirements.

The quantity of coke used for smelting iron in blast furnaces in 1946 dropped sharply from 1945, but was equivalent to 75 per cent of all deliveries of large coke. The increased activity of foundry operations resulted in a 14 per cent gain in shipments of foundry coke over 1945 and the total was the highest reported since 1927. The overall decline in coke production was the principal cause for the slight decreases in the distribution of coke for making producer gas, water gas, and for other industrial purposes. The heavy demand for industrial coke throughout the year resulted in the curtailment of domestic coke deliveries to the lowest point since 1927. This market has tendencies toward the opposite trend of industrial activity and total deliveries in 1946 were 4,965,918 tons, or 49 per cent, below the tonnage distributed to the domestic trade in 1936.

Pennsylvania, the leading coke producing and consuming state, accounted for 26 per cent of the total United States consumption. Ohio was next with 16 per cent, New York and Indiana with 9 per cent each, and Illinois and Alabama consumed 8 per cent and 7 per cent, respectively. Furnace coke was used in 17 states in 1946; however, 78 per cent of the total was consumed in Pennsylvania, Ohio, Indiana, Alabama and Illinois. Michigan, Ohio and Pennsylvania accounted for 38 per cent of the total coke consumed for foundry use.

The Southwest, Mountain and Pacific regions with new blast furnace capacity in Utah and California showed the largest increase in the use of coke with a gain of 68 per cent over 1940. The Southwest region registered a gain of 17 per cent principally because of substantial increases in the use of blast furnace coke in West Virginia, Kentucky and Tennessee. Increases in metallurgical coke consumption at the expense of domestic coke in the Lake Dock and the Illinois-Indiana region resulted in a net gain in total coke consumption over 1940 in both regions. The large decline in the use of domestic coke in the New England, Michigan, and Middle Atlantic regions accounted for the decreases in the total consumption in each of these areas. The decline in consumption of coke in Ohio was due to the drop in the use of blast-furnace coke which was not offset by increases in the use of foundry and other industrial coke.

Illinois consumed the largest tonnage of out-of-state coke in 1946, most of which was for blast furnace use. The amount shipped into that state was 1,768,550 tons, of which 93 per cent was supplied by Indiana and Kentucky. Ohio ranked second in total out-of-state receipts, obtaining 1,545,665 tons from 11 other states, Pennsylvania furnishing 73 per cent. Pennsylvania and New York were the only other states receiving more than half a million tons each from other states. Of the producing states, Virginia received the largest percentage of out-of-state coke with 75 per cent of her total consumption coming from seven other states.

Coke shipments from Alabama were the most widespread in 1946, extending to 30 other states, including the Far West and North and, in addition, 26,325 tons were exported. The total tonnage, however, was relatively small and represented but 12 per cent of the total distributed by producers in this state. Pennsylvania, as in previous years, was the leading state in quantity of interstate shipments, sending 2,461,737 tons to 23 other states. This state was also the principal exporter, accounting for 26 per cent of the total tonnage shipped to foreign countries.

Canada . . .

Toronto, Ont. — Steel production in Canada during May declined from the month immediately preceding as well as from the corresponding month last year, while pig iron showed little change from the previous months and ferroalloys registered a small gain in May.

For May, output of steel ingots and castings totaled 244,076 net tons or 82.5 per cent of total rated capacity, against 252,156 tons or 85.3 per cent in April. Output for the month under review included 235,978 tons of steel ingots and 8098 tons of steel castings.

Pig iron production in May amounted to 160,230 net tons, or 70 per cent of capacity, which was about the same rate as for April and for May, 1946. Pig iron output in May included 123,962 tons of basic iron of which 114,512 tons were for further use of producers and the balance for sale; 23,890 tons of foundry iron of which 23,500 tons were for sale and 390 tons for further use, and 12,378 tons of malleable iron, all for sale.

During May 15,325 tons of ferroalloys were made and included ferrosilicon, silicomanganese, ferromanganese, ferrochrome, chrom-x and ferrophosphorus.

Aircraft Wire—tinned or alloy coated and galvanized
Armature Binding Wire—tinned or alloy coated
Belt Hook Wire—tinned, galvanized or alloy coated
Bobby Pin Wire
Brush Wire—round scratch brush, tempered and untempered. High strain white liquor finish
Card Wire—tempered, round, angular, single convex, double convex
Curtain Spring Wire—round, flat
Fish Leader Wire
Flexible Shaft Wire—Music Wire quality
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Await Further Clarification Of Price Pattern in Steel

(*Continued from Page 60*)

been changed, carbon ranges being revised with the top limit now .60 per cent to 1.05 per cent maximum as against the former range of .60 to 1.00 per cent. Silicon extras now permit consumers to specify over .15 per cent to .60 per cent, for which an extra of 25 cents per 100 lbs applies. Formerly this same charge applied on the range of over .15 per cent to .30 per cent.

Additional size extras covering 29 and 30 gages now are applied on hot-rolled annealed carbon sheets, 19 gage and lighter. Previously these two gages were shown as black plate. The new size extras exclude previous width ranges from 52-in. up to 86-in. Changes also have been effected in oiling extras, while the extra for greased edges has been cut from 10 to 5 cents per 100 lbs.

Changes in chemical requirement extras on hot-rolled annealed sheets, 19 gage and lighter, include revisions in the top carbon range and a new list of manganese ranges and extras. Sulphur ranges also have been revised, as have the silicon ranges. Hereafter application must be made for the extra on copper content, previously this charge being listed at 50 cents per 100 lbs. A revision in packaging extras also has been effected.

New size extras have been set up on galvanized flat sheets in widths 1½ to 1 in. On widths under 6-in. on 29 to 32 gages, new extras also are provided. Increases in size extras of from 15 to 32 gages have been made on all other widths amounting to from $3 to $5 per ton. For extra smooth galvanized flat sheets, a charge of 25 cents per 100 lbs now is made against none previously. Extras for greased edges have been reduced to 5 cents from 10 cents but a new extra of 10 cents has been set up for coating control and testing.

On cold-rolled carbon sheets extra revisions are about in line with those on hot-rolled sheets. Chemical requirement extras covering silicon range have been adjusted similar to the adjustment on hot-rolled.

Vitrenamel length extras have been revised to line up with those on cold-rolled carbon sheets, and a few revisions in packaging extras have been effected. Width extras have been adjusted on long ternes, resulting in increases ranging from $3 to $5 per ton. When drawing quality is specified under the new long terne extras, the 25 cent charge for special killed steel does not apply. Extras for paper interleaved coils, all gages, now is 20 cents; for cut lengths, 22 gage and heavier, the extra is 50 cents and for cut lengths, 23 gage and lighter, it is 75 cents. Also new are special stenciling ex-

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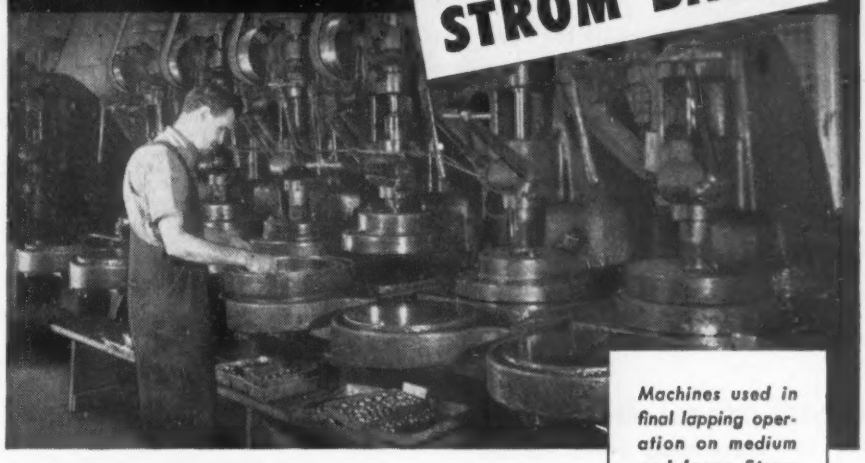

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tras, for 24 gage and heavier 25 cents being charged, for 25 to 28 gage, inclusive, 50 cents; 29 and 30 gage, inclusive, 75 cents, and 31 gage and lighter, $1.

A new card of extras has been issued on electrical sheets as reported in STEEL (Aug. 4, p. 146). Also nearly all producers have advanced pickling extras on sheets from 5 cents to 25 cents.

Market observers, as a general thing, look for additional changes in extra cards to be made as experience brings out flaws in existing schedules. For that matter, changes have been under way in these cards since the first of the year when the lists were given a general overhauling.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

3150 tons, New Jersey state viaduct, route 25, section 34, over Pennsylvania and Lehigh Valley tracks, to Franklin Contracting Co., Newark, N. J.

855 tons, E. 83rd St. subway substructure and superstructure, Department of Public Works, Chicago, to Bethlehem Steel Co., Bethlehem, Pa.; Michael J. McDermott & Co., Chicago, contractor.

815 tons, Pennsylvania state bridge, Wilkes Barre, to American Bridge Co., Pittsburgh.

400 tons, telephone exchange addition, Seattle, to Isaacson Iron Works, Seattle.

325 tons, bridge, project F194(2), Nebraska, for state, to Omaha Steel Works, Omaha.

300 tons, mill addition, Forstmann Woolen Co., Garfield, N. J., to American Bridge Co., Pittsburgh.

235 tons, municipal power plant, Alexandria, Minn., to Bethlehem Steel Co., Bethlehem, Pa.; Midwest Engineering Co., St. Paul, contractor.

223 tons, bridge, sec. 17R-1VF, Whiteside county, Ill., for state, to American Bridge Co., Pittsburgh.

185 tons, bridge, sec. 25S-F, Morgan county, Ill., for state, to American Bridge Co., Pittsburgh.

113 tons, bridge, project FAP F454(1), Nebraska, for state, to Omaha Steel Works, Omaha.

109 tons, bridge, project FAP S219(1), for state, to Omaha Steel Works, Omaha.

100 tons, telephone exchange addition, Olympia, Wash., to Isaacson Iron Works, Seattle.

STRUCTURAL STEEL PENDING

5340 tons, South Capitol St. bridge, Washington, D. C.

3150 tons, state viaduct, over Pennsylvania and Lehigh Valley tracks, Newark, N. J., Franklin Contracting Co., that city, low on general contract.

3000 tons, Bay Shore Freeway, California.

1300 tons, public school No. 22, Bronx, New York city, Wilaka Construction Co., 11 East 44th St., low on general contract.

900 tons, approximately, public school No. 164, Queens, New York city, pending.

750 tons, diesel shop, Chicago & North Western Railroad, Chicago; bids Aug. 24.

100 tons, turbo-generator foundation, East Shore Public Service Corp., Vienna, Md.; bids pending.

Unstated tonnage, public school No. 131, Queens, New York city, pending.

REINFORCING BARS . . .

REINFORCING BARS PLACED

380 tons, Washington state Buckley school, to Bethlehem Pacific Coast Steel Co., Seattle.

275 tons, chemistry building, University of Illinois, Urbana, Ill., to Bethlehem Steel Co., Bethlehem, Pa.; John Felmley Co., Bloomington, Ill., contractor.

127 tons, nurses home, Swedish Covenant hospital, Chicago, to Joseph T. Ryerson & Son Inc., Chicago; Carl E. Erickson Co., Chicago, contractor.

125 tons, store remodeling, Carson, Pirie, Scott & Co., Chicago, to Ceco Steel Products Corp., Chicago; George A. Fuller Co., Chicago, contractor.

110 tons, administration building, Aluminum Co. of America, Davenport, Iowa; to Concrete Steel Co., Chicago; George A. Fuller Co., Chicago, contractor.

REINFORCING BARS PENDING

800 tons, auxiliary outlet sewers, Paulina St. system, cont. No. 1, Department of Public Works, Chicago; Kenny Construction Co., Chicago, low on general contract; bids July 29.

400 tons, housing project, Illinois Institute of Technology, Chicago; bids Aug. 4.

335 tons, separator for disposal system, Cities Service Oil Co., East Chicago, Ind.

144 tons, sewage treatment plant, Tomah, Wis.; bids Aug. 8.

Unstated, 8 units for University of Washington, Seattle; bids Aug. 21, Sept. 2 and 23, Oct. 14; $5 million project; bids for four more units at later dates.

Unstated, $1½ million senile ward, Eastern Washington hospital; bids to Olympia, early September.

Unstated, $500,000 plant for Fibreboard Products Inc., Portland, Oreg.; general contract pending.

Unstated, pier and storage warehouse, Port of Portland; General Construction Co., low, $1,829,977.

Unstated, state bridges in Multnomah, Clackamas, Jackson, Lane and Jefferson counties, Oregon; bids to Portland, Aug. 25-26.

PLATES . . .

PLATES PENDING

Unstated, siphon project, Minidoka project, Idaho; bids to Bureau of Reclamation, Burley, Idaho, Sept. 8.

RAILS, CARS . . .

RAILROAD CARS PLACED

Armour & Co., 2000 forty-ton steel refrigerator cars, 1000 each going to the General American Transportation Corp., Chicago, and the American Car & Foundry Co., New York.

Chesapeake & Ohio, 1000 seventy-ton hopper coal cars, to American Car & Foundry Co., New York.

Chicago & Eastern Illinois, 200 fifty-ton welded steel box cars, to American Car & Foundry Co., New York.

Chicago, Milwaukee, St. Paul & Pacific, 1000 fifty-ton hopper cars, to Pressed Steel Car Co., Pittsburgh.

Gulf, Mobile & Ohio, 50 seventy-ton covered steel hopper cars, to American Car & Foundry Co., New York.

New York, New Haven & Hartford, 1000 fifty-ton box to Pullman-Standard Car Mfg. Co., Chicago.

Tennessee Central Railway, 100 fifty-ton hopper cars, to American Car & Foundry Co., New York.

Union Pacific, 1600 fifty-ton box cars, to Pullman-Standard Car Mfg. Co., Chicago.

Union Tank Car Co., 2000 refrigerator cars, to American Car & Foundry Co., New York.

Detroit, Toledo & Shore Line, 100 covered hopper cars, to General American Transportation Corp., Chicago.

RAILROAD CARS PENDING

Pennsylvania, 50-ton box cars in lots of 500, 1000 and 2000; bids asked.

Lehigh Valley, 500 fifty-ton hopper cars.

Boston & Maine and Maine Central, total of 750 box cars; bids asked.

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STYLE "M"
ROLL FEEDS
BUILT to give the same durable service as other LITTELL Feeds. Hardened, ground, tool steel rolls. Reversible feed. Adjustable timing. Silent, positive operation. Adapted for use with Littell Reels and Straighteners. (See illustration below, at right).
Littell makes a complete line of Reels, Feeds, Straighteners, Air Blast Valves, Vacuum Pickers, etc.
REQUEST BULLETINS
During the National Machine Tool Builders Show, Chicago, Sept. 17-26, we are keeping open house at our shop. See display of our Automatic Feeds and Reels for Coiled Stock at our Plant.
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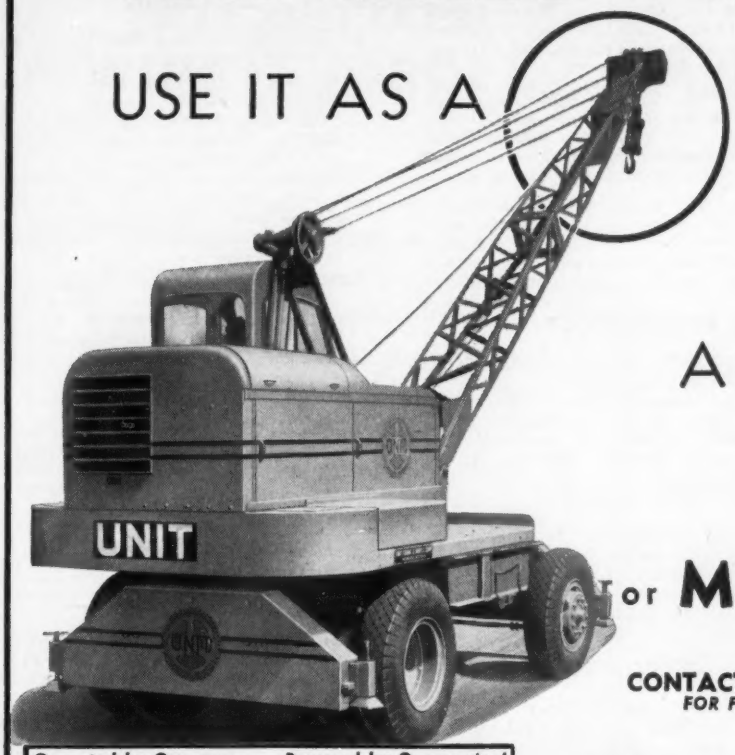
USE IT AS A CRANE



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CONSTRUCTION AND ENTERPRISE

CALIFORNIA

LOS ANGELES—Utility Tool & Die Manufacturers Inc. has been formed by George M. Bryant, 617 Federal Bldg., and associates with a capital of $200,000, plus 30,000 shares of no par value stock.

LOS ANGELES—Southern California Pipe & Steel Co. has been incorporated by J. Kaplan and associates with a capital of $500,000. Firm is represented by A. Joseph Shapiro, 210 W. 17th St.

LOS ANGELES—Mahl Steel & Supply Co. has been incorporated by J. Thomas Mahl and associates with a capital of $150,000. Firm is represented by Guthrie, Darling and Shattuck, 737 Pacific Mutual Bldg.

LOS ANGELES—Evans Corp. has been formed by Gladys Sutter and associates with a capital of $75,000 to manufacture, import and export steel and other metals, materials, supplies, parts, products or merchandise. Firm is represented by Abe Levin, 6233 Hollywood Blvd.

SAN FRANCISCO—Fabrimetals Inc. has been formed by Clinton E. Wilcox and associates with a capital of $250,000, plus 25,000 shares of no par value stock. Firm is represented by Norman A. Eisner, 1074 Wills Bldg.

SAN FRANCISCO—A. Carlisle & Co., 135 Post St., has let a $556,000 contract to Meyer Construction Co., 200 Quint St., for a lithographing plant.

SAN FRANCISCO—Brodhead Steel Products Co. has been incorporated with a capital of $100,000 by Elmer E. Brodhead. Firm is represented by Keesling & Keesling, 315 Montgomery St.

SAN JOSE, CALIF.—General Electric Co., 5441 E. 14th St., Oakland, is having plans prepared for construction of a $1,700,000 factory for the manufacture of electric motors on Monterey Rd. here. Structural engineer is Leland S. Rosener, 233 Sansome St., San Francisco.

SAN LEANDRO, CALIF.—Peterson Tractor & Equipment Co., 685 A St., Hayward, proposes to build a $300,000 plant here. Engineers are Indenco Engineers, 656 31st St., Oakland.

SANTA CLARA, CALIF. — Owens-Corning Fibre Glass Corp., 1500 Nicholas Bldg., Toledo, O., plans to build a $500,000 factory here. Engineer and architect is Austin Co., 16112 Euclid Ave., East Cleveland, O.

TRONA, CALIF.—American Potash & Chemical Corp. has placed a $500,000 order with Standard Steel Corp., Los Angeles, for processing equipment. This is part of American's $5,850,000 expansion program at Trona.

CONNECTICUT

WINDSOR, CONN.—Hartford Machine Screw Co., 476 Capital Ave., will build an $850,000, 2-story factory on Deerfield Rd. Contract has been awarded to Industrial Construction Co., 721 Main St., Hartford. Engineers are Buck & Buck, 650 Main St.

DELAWARE

WILMINGTON, DEL.—E. I. duPont de Nemours & Co., duPont Bldg., has awarded a $373,000 contract to J. A. Bader & Co. Inc., 923 Market St., for construction of a pigment building. Engineer is H. M. Gorden, c/o owner.

KENTUCKY

LOUISVILLE, KY.—Mason Paint Co., 709 Roselane, will build a $150,000 paint manufacturing plant.

MOREHEAD, KY.—Tennessee Gas & Transmission Co., Commerce Bldg., Houston, Tex., plans to build a $477,000 experimental compressor station here.

NEBRASKA

OMAHA, NEBR.—International Harvester Co., 180 N. Michigan St., Chicago, will build a branch warehouse and office here costing $300,000.

OHIO

ASHTABULA, O.—New York Central Railroad is building a $105,000 service building here and also has under way a $72,000 boiler replacement program.

CINCINNATI—Eagle-Pitcher Sales Co., Langdon Farm Rd. and Seymour Ave., has awarded a $200,000 contract to H. K. Ferguson Co., Peoples Bank Bldg., for construction of a factory and warehouse. Same firm was also awarded a $55,000 contract to build a 1-story office building in conjunction with the other project.

CINCINNATI — National Cylinder Gas Co., 4620 Este Ave., has awarded a $150,000 contract to H. K. Ferguson Co., Peoples Bank Bldg., for construction of a 2-story plant and warehouse addition.

OKLAHOMA

DUNCAN, OKLA.—Skelly Oil Co., Box 1650, Tulsa, has awarded a $960,000 contract to Born Engineer Co., 404 N. Boston St., Tulsa, for design and construction of a natural gasoline plant.

UTAH

MURRAY, UTAH—Intermountain Laboratories, Salt Lake City, will build a $100,000 factory here.

SALT LAKE CITY, UTAH—Standard Oil Co. of California, 225 Bush St., San Francisco, is making tentative plans for a $2,500,000 factory here.

TALMAGE, UTAH—California Co., Rangley, Colo., plans to construct a $325,000 booster pumping station here.

WISCONSIN

FOND DU LAC, WIS.—Fond du Lac Pattern Works, 336 N. Military Rd., has been formed by Clarence A. Baumgardt and Harold Radloff to make patterns for foundry castings of all types of metals.

GREEN BAY, WIS.—Wisconsin Public Service Corp. has awarded a $5,250,000 contract to C. R. Meyer & Sons Co., 50 State St., Oshkosh, for construction of an additional generating unit at a steam plant here.

LA CROSSE, WIS.—Allis-Chalmers Mfg. Co., Milwaukee, plans to build a 150 x 368 ft addition to its farm machinery plant here which will increase production 30 to 40 per cent.

MILWAUKEE—Sivyer Steel Casting Co., 1675 S. 43rd St., has awarded a $55,000 contract to Klug & Smith Co., 111 E. Wisconsin Ave., for a foundry.

STURGEON BAY, WIS.—Economy Electric Lantern Co. Inc. will build a $50,000 plant here. The firm will move here from Milwaukee.

WEST MILWAUKEE, WIS.—Chain Belt Co., 1600 W. Bruce St., has awarded a $114,000 contract to Hunziner Construction Co., 4541 N. 124th St., for a 1-story boiler house.

CANADA

HEDLEY, B. C.—Kelowna Exploration Co. Ltd. plans to spend $150,000 on mill expansion. Engineer is P. Billingsley, c/o owner.

SARNIA, ONT.—Electric Auto Lite Co. Ltd., Christina St., W. E. Orth, manager, has awarded a $284,000 contract to R. W. McKay, 400 N. Front St., for construction of a plant substructure. Architect is W. E. Whalen, 1949 Foster St., Toledo, O.

SARNIA, ONT.—Fiberglas Canada Ltd., Oshawa, has awarded a $500,000 contract to R. W. McKay for construction of a plant building. Architects are Allward & Gruinlock.

TORONTO, ONT.—Gair Co. of Canada Ltd., 372 Bay St., G. M. Willoughby, secretary, plans to build a $3 million plant at Tretheway Dr. and Industry St., Mt. Dennis. Engineer is D. Shepherd, 57 Bloor St. W.

WINDSOR, ONT.—Garden Tractor & Equipment Co. Ltd., 1164 Albert Rd., proposes to build a $250,000 plant and boiler house. Plans are by H. C. Beckett, 52 Chatham St. W.

Fabricators and Car Builders agree that material handling time is the chief factor in the *economics of production.*

The Thomas Automatic Spacing Machine is the solution to the handling problem. In addition it eliminates the need for marking and assures proper spacing of rivet holes in limitless number of pieces. Thus costs are substantially reduced and production speeded.

Write for Bulletin 306

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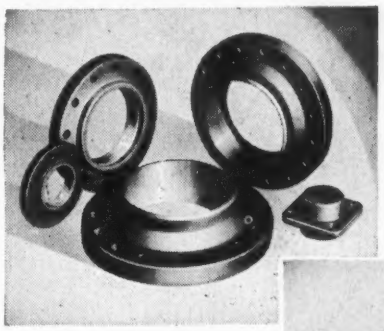
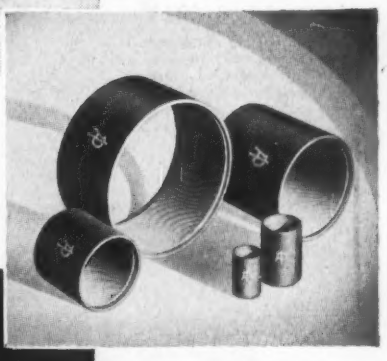
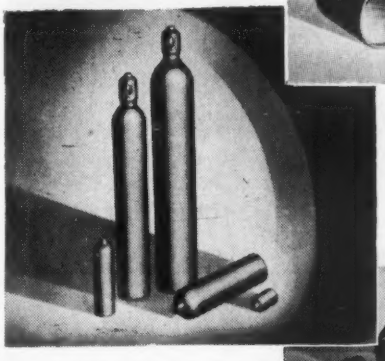
The science and "know-how" of Harrisburg craftsmanship begins with the steel... by selecting only the highest grade of quality steel. That is why Harrisburg enjoys a reputation for product superiority... wherever fine performance and durability are in demand.



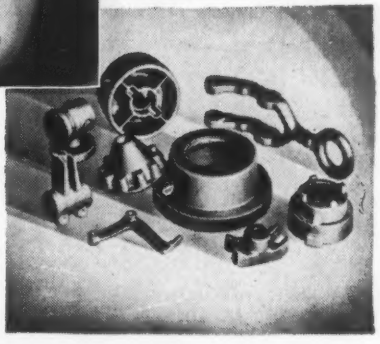
Harrisburg Drop-Forged Steel Pipe Flanges are made to A.S.A. standards and can be furnished in standard or special types to meet your exact requirements.



Harrisburg Seamless Steel Pipe Couplings are manufactured to A.P.I. specifications and are available in all sizes.



Harrisburg Seamless Steel Cylinders for high pressure gases. Available in standard or lightweight.



Harrisburg Drop and Hollow Forgings are available in all sizes, from the simplest to the most intricate designs.

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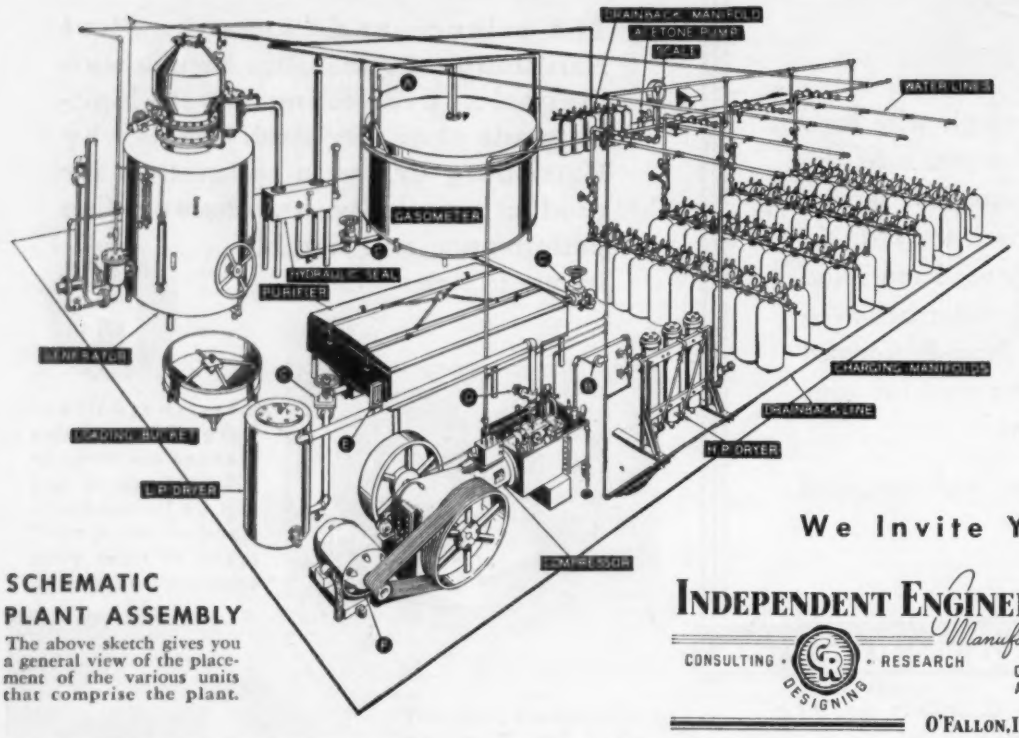
Low Pressure ACETYLENE PRODUCING PLANT

that Charges up to 160 CYLINDERS at ONE TIME



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The above sketch gives you a general view of the placement of the various units that comprise the plant.

For the Prospective Gas Manufacturer this complete plant layout provides for extremely *simple* operation and exceptionally *low* maintenance costs.

The entire plant is designed to provide ample storage room for filled tanks and compact enough for the Chief operator to observe all operations. Rated capacity, 2700 cu. ft. per hour.

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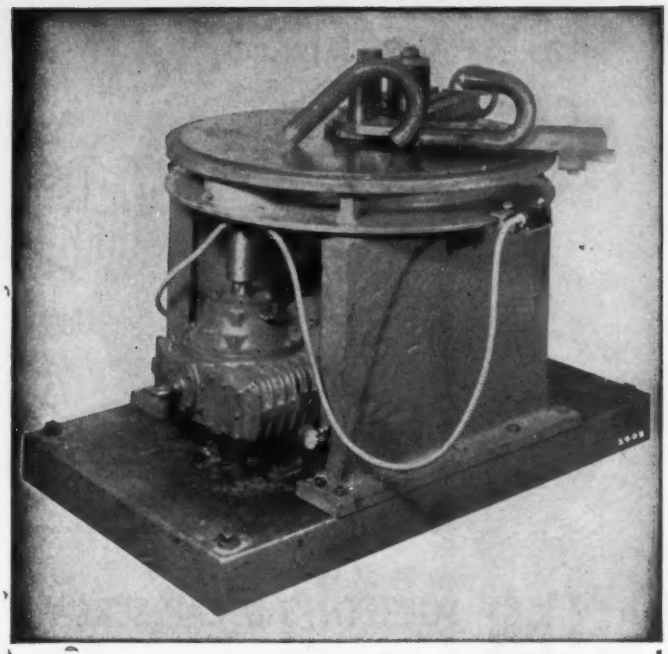

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For NEAT, EFFICIENT, ECONOMICAL MARKING

Whether your marking is in a straight or curved line or on a flat, concave or convex surface, Matthews Steel Type and Holders give legible impressions with perfect alignment and spacing. Type can be quickly and conveniently changed. Consult your nearest Matthews representative or write for Supplement A for full details.

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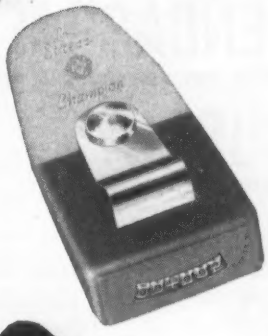
Recommended for all stamping applications except high chrome or nickel alloy steels. Can be used interchangeably with type $\frac{1}{8}$ to $\frac{3}{16}$ inches in size.



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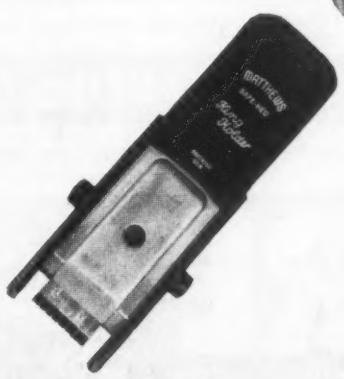
For 90% of all heavy or medium duty marking. Type size up to ½ inch, made for any desired type capacity. Maximum recommended slot is 3 inches.



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Compactly built for stamping small characters in a limited space. Type up to $\frac{1}{16}$ inch can be used, with capacity to suit your requirements.

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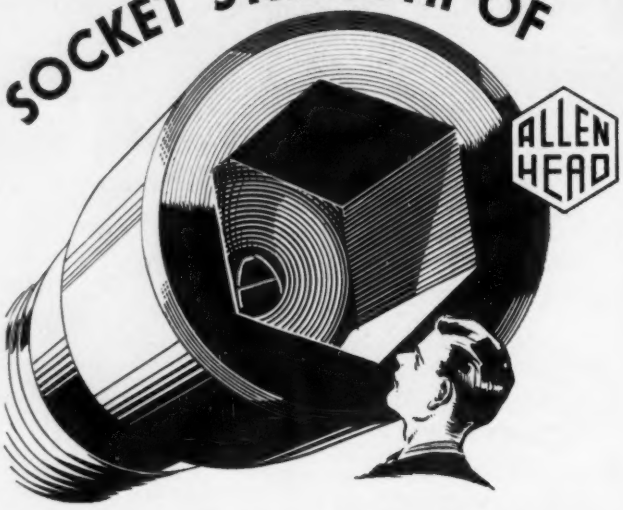

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Note the perfect accuracy of hex socket, — so true that the engaging key bears equally on all surfaces. Note that socket and head are *"Pressur-formd"*, — not shaped by cutting. There's extra strength in the uncut steel fibers, — and that goes too for the *pressur-formd* threads, accurate to a high Class 3 fit. Ask your local *Industrial Distributor* to show how "Allens" simplify product designs.

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1—set Pinion Housings complete with new babbitt bearings
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Shoes for 1 set pinion and 3 sets Mill Housings

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Steel Plates (4) 3" x 28" x 139¼". Steel Sheets preferably 11 or 12 gauge, new or used, could use floor plates. (36) 4' x 10', (68) 4' x 8' and (24) 6' x 12' all for lining coal chutes.

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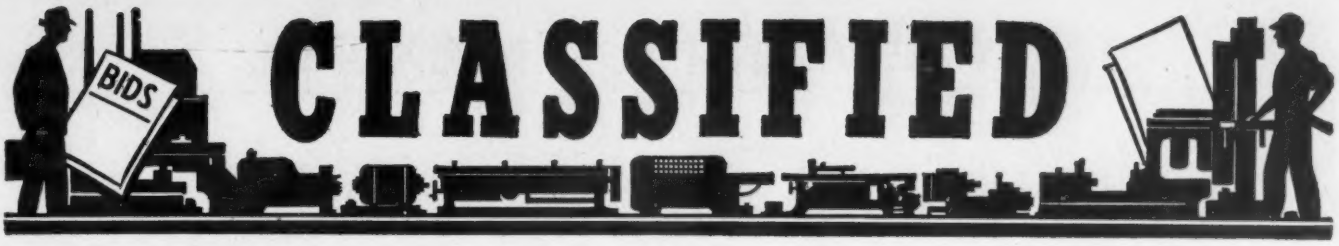

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Must possess ingenuity and ability with knowledge of designing and estimating. Excellent opportunity for aggressive, energetic young man.

Write Box 156,
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Apply immediately giving references and experience

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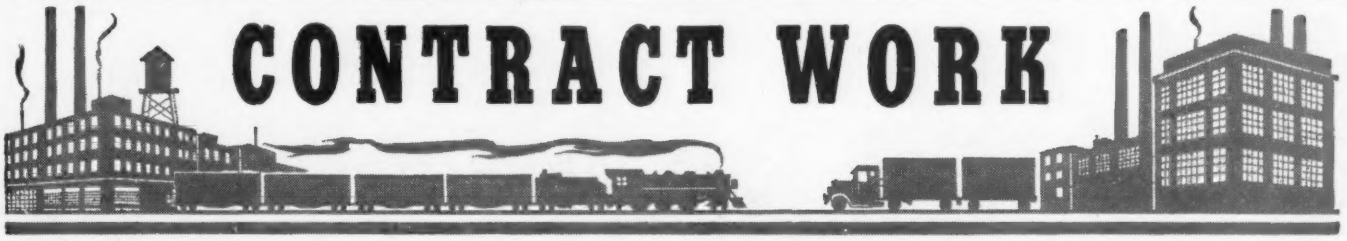

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With facilities for normalizing and sandblasting.

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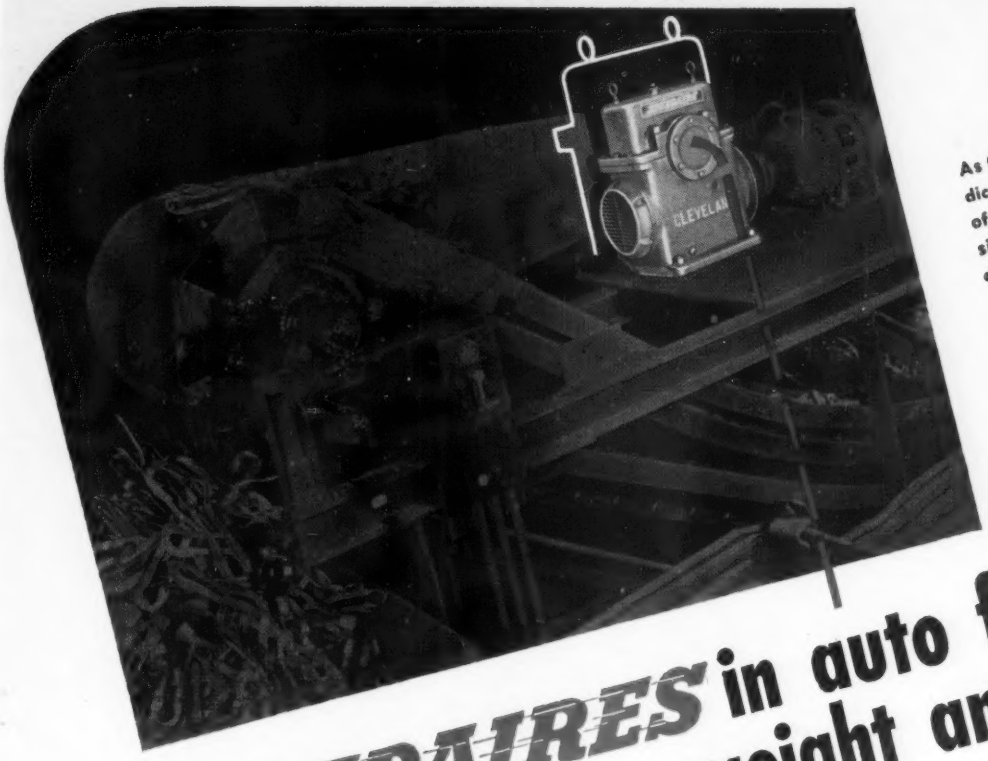

As the white outline indicates, a standard unit of much greater frame size would be required to do the work of Speedaire.

13 SPEEDAIRES in auto forge shop save money, weight and space

THIRTEEN Speedaires are at work in this auto forge shop. Three drive cold scrap trim conveyors, two operate scrap rattlers, and eight drive cold billet conveyors. For each application, Speedaire offered three big advantages—a saving in cost, a saving in weight, and a saving in space occupied. The unit shown here, driving a scrap conveyor, weighed 25% less, took 40% less space than a conventional worm-gear unit required to do the work, and saved $84.50.

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For full description, send for Catalog 300. The Cleveland Worm & Gear Co., 3270 E. 80th St., Cleveland 4, Ohio.

Affiliate: The Farval Corporation, Centralized Systems of Lubrication. In Canada: Peacock Brothers Limited.

CLEVELAND
Worm Gear
Speed Reducers

Now!

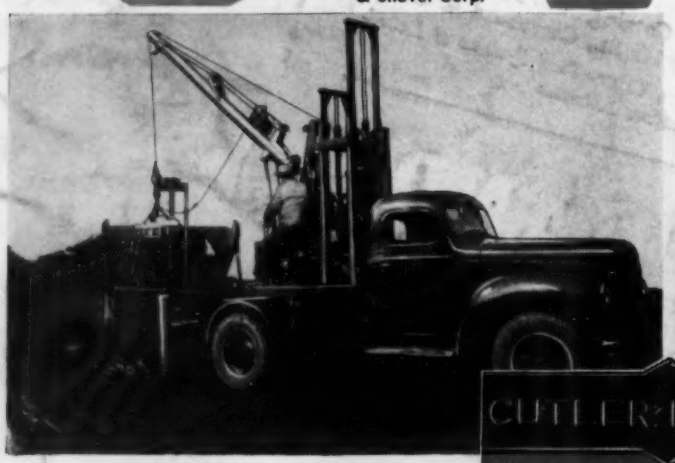
mobile mounted Cutler-Hammer magnets speed steel and iron handling

C-H Magnet on crawler type crane built by Unit Crane & Shovel Corp.

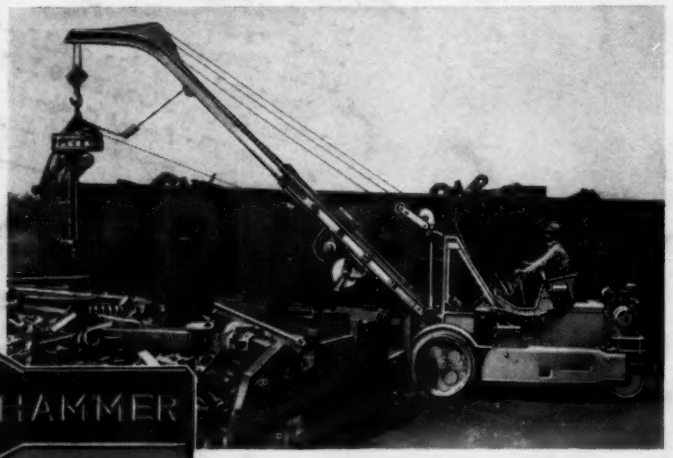
Handling iron and steel swiftly and economically in factory and plant areas beyond the reach of overhead traveling cranes and locomotive cranes . . . is a problem that has now been solved. Cutler-Hammer Lifting Magnets, mounted on mobile cranes, are always-ready, versatile units that literally can go anywhere . . . into storage yard, warehouse, stockroom or shop.

These mobile mounted magnets make *short* work, *easy* work, *economical* work of handling castings, borings, turnings, pig iron, car wheels, steel shafting, scrap. And they are not limited to the location of crane runways, railroad tracks—or the availability of electric power lines.

Cutler-Hammer Magnets can be mounted on anything that moves, that has a boom and a source of power. Cutler-Hammer Magnets provide maximum load per lift, maximum lifting power all day long, and hold that maximum lifting power year in and year out. Cutler-Hammer Magnets are built ruggedly to stand up under heavy punishment because of structural advantages such as manganese bottom plate, dynamo steel body, coil impregnated under heavy vacuum, water-tight terminal box, long wearing chain construction, etc., etc. Get your Cutler-Hammer Lifting Magnet direct, or already mounted from crane or truck manufacturer. But *insist* on the genuine Cutler-Hammer Magnet. CUTLER-HAMMER, Inc., 1267 St. Paul Avenue, Milwaukee 1, Wis.



C-H Magnet on Milwaukee Hydraulics Corporation's mobile crane handles iron and steel anywhere in scrap yard.



C-H Magnet on Silent Hoist & Crane Co.'s "KRANE KAR" transfers scrap to rail cars.

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SUPERMAGNETS
C-H